# The Electragist

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# A Letter to Friends:

February 1, 1928

Gentlemen:

Subject: Inland Glass

We believe that any manufacturer reaches the highest degree of satisfactory relations with his distributors, and they with their customers, only by stating facts. With this in mind we are writing this, an announcement, of a newly organized old institution, and laying frankly before those interested in Illuminating Glass our fundamental beliefs and objectives:

First -That the distributor and manufacturer must be mutually satisfied that the character and quality of the article handled is correct.

Second - That each must be satisfied with the terms of the compensation resulting.

Third - That they are in accord with the method of distribution employed by each other.

Fourth - That each must accept his responsibility to the other.

Fifth - That they must know the wisdom of carrying on without qualification the spirit of all agreements and intentions.

Any business built on this foundation is bound to succeed. We are pledging ourselves, and most cordially invite you to subscribe also and join us in our success. Our plant is in full operation and shipments being made on schedule, and our new catalog is now being distributed.

Sincerely yours,

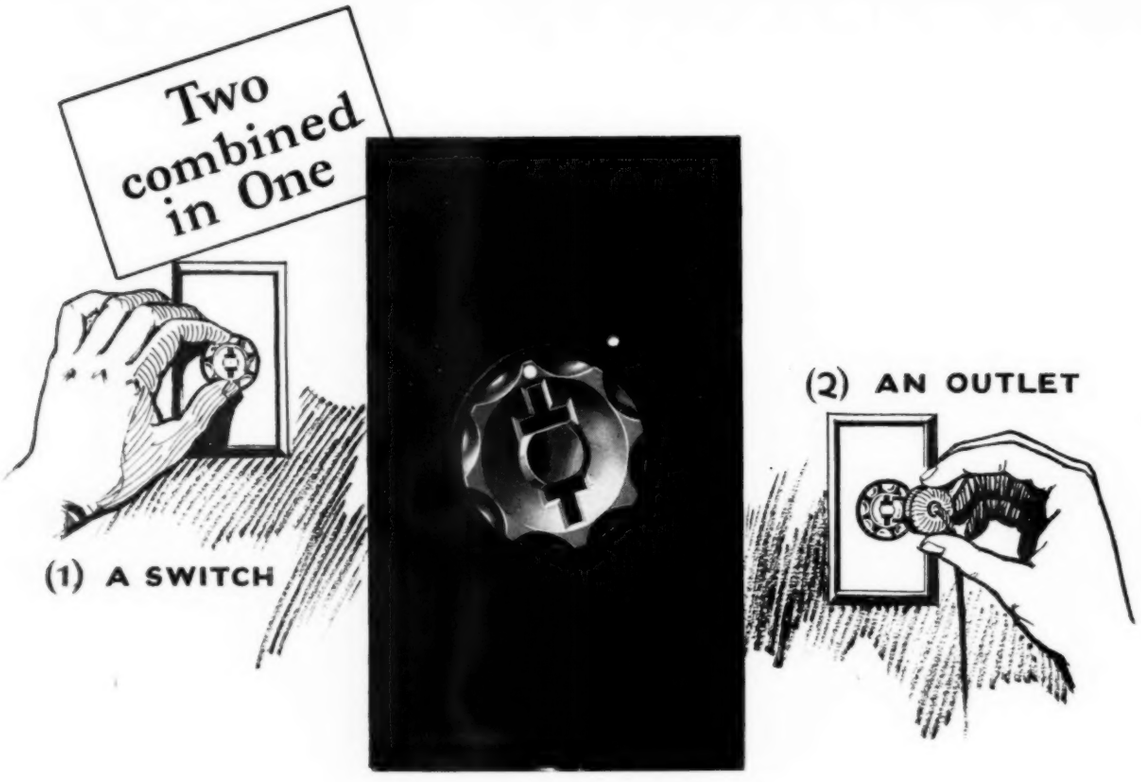
THE INLAND GLASS WORKS, INC.

J. H. Allen

V. Pres. and Gen. Mgr.

# Inland

The Largest in the Middle West




# A new Hubbell convenience
## that meets a multitude *of* needs!

A SWITCH and T-slot outlet—two units in one! The face of the outlet is raised and grooved to provide a grip for the fingers. It serves as a switch and outlet combined!

A quarter turn to the right—and the switch is on. A quarter turn to the left—and the switch is off.

The "Switch-Tap" may be wired so that the T-slots are always alive—the switch controlling the lights only. Or it may be wired so that the switch can be used exclusively for the purpose of controlling the outlet.

With a Hubbell "Switch-Tap" in the bathroom, the lights can be controlled without disturbing the curling iron or vibrator.

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HARVEY HUBBELL, INC.
BRIDGEPORT, CONN., U. S. A.

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*Bridgeport, Conn., Main Office*

Boston, Mass.
176 Federal St.

Atlanta, Georgia
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Pittsburgh, Pa.
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30 East 42nd St.

Chicago, Illinois
318 W. Washington St.

Denver, Colo.
1109 Broadway
The Sales Service Co.

Philadelphia, Pa.
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Philadelphia Bourse
(Exhibition Dept.)

San Francisco, Cal.
390 Fourth St.
Garnett Young & Co.

*Send complete information on Hubbell "Switch-Taps"*

Name .....

Address .....

E-6-2-28.

City and State .....

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# The Electragist

*(The National Electrical Contractor and The Electrical Contractor-Dealer)*

*Official Journal of the*
*Association of Electragists—International*

Vol. 27 FEBRUARY, 1928 No. 4


# "APPROVED"

## What Does It Mean?


By S. B. WILLIAMS,
Editor, The Electragist


"ONLY approved fittings and materials shall be used." Thus, do local ordinances and Codes attempt to safeguard the public against the use of substandard, inferior electrical material.

But what does approved mean? The electrical industry generally and many inspectors have taken "approved" to mean "approved by Underwriters' Laboratories." The National Electrical Code, however, says "acceptable to the inspection department having jurisdiction."

Is it fair to thus "pass the buck" to the local inspection departments and what effect if any, does this condition have upon the alarming production and sale of non-labelled and substandard electrical products?

Underwriters' Laboratories is a commercial body in the sense that it is owned by private interests and works for money. Because of this fact it has been difficult to secure recognition of Underwriters' Laboratories' approval that would hold water legally.

This situation, however, is being taken care of because the test standards of Underwriters' Laboratories are industry standards and as such will, as soon as certain technicalities are disposed of, become an American Engineering Standard. Then the Laboratories' approval will have legal value because it will be recognized as prima facie evidence of best practice.

In the meantime, however, Article 1 Committee in its revision of the National Electrical Code is, apparently, unwilling to give the local inspection departments the backbone they need by giving to "approved" a definition that really means something.

The inspectors want a definition. We have just finished an investigation both by questionnaire and local interviews and the results are very definite. Inspectors do not like having the responsibility for determining whether a product is acceptable.

Inspectors are not in a position to test materials. The most they can do is to give the product a superficial examination. They have no way of checking back to the factory to assure themselves that the output will be as good as the sample submitted.

What is the result? A number of inspectors stated very frankly that they seldom or never turned anything down.

What then is the use of maintaining at considerable expense an organization at Chicago and New York for making laboratory and field examinations? Of what value are Underwriters' Laboratories approval? Why all the stir about labelled products?

If the inspectors are willing to pass almost anything that comes to them, because they are unwilling to take the responsibility of turning things down, what is the use of having any standard?

The inspectors want to know that approved definitely means "approved by Underwriters' Laboratories or some other recognized competent body in accord with American Engineering Standards." Some, of course, have assumed this, and have so ruled, and in those jurisdictions anything not so approved may not be used.

Fear of legal proceedings has kept many inspectors from assuming any responsibility as to making approvals. They will not put themselves in a position where either they or their principals may be sued by any manufacturer whose product might not have been deemed acceptable. The same inspectors, however, operating under the National Electrical Code would have no hesitancy in refusing permission to use equipment which had not passed Underwriters' Laboratories or some other recognized competent body if the Code would only so define "approved."

Since the Electrical Committee cannot be persuaded that a better definition for "approved" is essential, a growing number of local jurisdictions are making their own definition by ordinance. These jurisdictions are trying to find a way to curb the sale and installation of substandard wiring supplies.

The best known of these is Portland, Oregon. There the courts have upheld the municipal inspection department in its interpretation of the local ordinance requiring that only equipment approved by Underwriters' Laboratories may be used in Portland.

What is the result? The Portland hardware stores, specialty shops, drug stores, five-and-tens may no longer sell cheap substandard material to an unsuspecting public.

Canada in its new electrical Code had the courage to define "approved" thus:

"When used with reference to any particular electrical equipment, means that such equipment has been submitted for examination and test to Underwriters' Laboratories of Chicago, or to the laboratory of the Hydro-Electric Power Commission of Ontario, or a recognized Canadian Government Laboratory and that a formal written report thereon has been obtained, to the effect that such equipment is suitable for sale and use. When used with reference to any type of wiring, form of construction or method of installation, it means that it is acceptable to the inspection department, and that written notification to that effect has been given."

Within another two years there will be a large number of cities that will be attempting to prevent the sale and use of substandard products. Most of these will undoubtedly be satisfied to accept Underwriters' Laboratories approval as final and complete authority. Others, however, will be unwilling from a legal standpoint to so accept Laboratories' approval unless it is so stated in the Code. They will take the next step, namely, set up a local laboratory.

Nothing worse could happen than to have a number of local laboratories for testing electrical equipment. Different standards would be set up. One laboratory is essential.

The National Electrical Code is now recognized as prima facie evidence of best practice from the standpoint of safety measures. If it will define approved to mean "approved by Underwriters' Laboratories, Bureau of Standards, or other recognized and equally competent body conforming to American Engineering Standards," the local authorities will accept it and abide by it.

Why pussyfoot any longer? The field wants it. Every inspector we have talked to or written to on the subject wants a clear and specific definition. They want "approved" to mean something. They are sick and tired of having the buck passed back to them.

# Selling Garage Wiring Jobs by Mail

## Co-operative Effort to Secure Garage Wiring Jobs From Architects and Home Owners by a Campaign of Letters

MEMBERS of the Kansas City Electric Club, through G. W. Weston, secretary-manager, have begun a cooperative letter campaign sent once a month to 251 architects and home builders designed to secure garage wiring jobs. The letters are specifically concerned with the wiring of garages, with the plea that every garage have at least a ceiling light controlled by a switch at the door, and a duplex convenience outlet. The letters are carefully multigraphed on a three color letterhead.

The appeals are: The convenience of a well-lighted and well-wired garage, and the chance for a good builder to secure the good will of satisfied clients by having the garage wired right.

THE KANSAS CITY ELECTRIC CLUB

A COOPERATIVE SERVICE ORGANIZATION

KANSAS CITY, MO.

To Architects and
Home Builders:

Subject: UNWIRED GARAGES

In this day of auto transportation, can a new residence without a garage be sold?

Of course not!

If the garage is so vitally important, then why is it that some builders try to "get by" by building and selling a house with an unwired and unlighted garage?

What happens in such a case?

Many families in the market to buy a new home do not happen to notice whether or not the garage is wired. If they do, the builder usually tells them he will have it wired.

If they don't notice it, then they move in and it isn't very long until they find out that they are required to flounder around in a dark garage so many times that they become exasperated.

They usually take their spite out on the builder, who does not seem to realize that instead of building up goodwill and an enlarged list of satisfied clients, he is building up a list of knockers.

This is a short-sighted policy which a progressive builder cannot afford to follow.

Every garage should have, at the very least, a ceiling light controlled by a switch at the door, and a duplex convenience outlet, preferably on the rear wall and about three feet above the floor. A basement garage should have the light controlled by a pair of 3-way switches, so that the light can be controlled both going and coming.

Yours very truly,

G. W. Weston

THE KANSAS CITY ELECTRIC CLUB

A COOPERATIVE SERVICE ORGANIZATION

KANSAS CITY, MO.

To Architects and
Home Builders:

HOW SHOULD A GARAGE BE WIRED?

According to the combined experience of our industry, the least that a garage should have is a ceiling light, located over the car hood, and controlled by a wall switch at the entrance; and a duplex convenience outlet, preferably located on the rear wall and about three feet above the floor. For good lighting, a two-car garage needs a ceiling light over each car hood.

In an attached garage it is decidedly convenient to control the light from both entrances by a pair of 3-way switches. The same convenience results, in the case of a detached garage, by having an outside bracket light on the garage controlled both at the house and at the garage. This provides a path of light between the garage and house and is a great comfort and convenience, especially in the wintertime.

Where a basement garage is a part of the open basement, at least one light should without fail be controlled by a pair of 3-way switches, one located at the head of the stairs and the other at the entrance to the basement garage.

In case the basement garage is walled off from the main portion of the basement, the most flexible plan is to control the garage light from both garage entrances by a pair of 3-way switches and then to control the basement stairs light by another pair of 3-way switches, one located at the head of the stairs and the other at the foot of the stairs.

If you will just follow the course of the family going and coming at night through the garage; and then, at other times, the owner or some other person using only the main portion of the basement, you will readily appreciate the advantage in having independent control of the garage light as well as the light for the basement stairs.

The garage nowadays is a very important part of a home and it should always be adequately wired.

Yours very truly,

G. W. Weston

# Hazard of Grounding to Circuit Wiring

By S. W. BORDEN
Member NEMA Grounding Committee

ELECTRICAL fire and shock hazards are a cause of retarded use of electricity, and unless controlled and substantially eliminated, can become so feared by the user that the free use of electrical energy will be severely hampered.

In the endeavor to establish uniform methods of construction and installation which, as far as possible, eliminate these hazards, the National Electrical Manufacturers' Association has recently approved certain practices. These are here discussed with the hope of clearing away technical detail and exposing fundamental principles.

### Cause of Shock Hazard

Shock hazard arises when a person is directly or indirectly in electrical contact with the ground (earth) and at the same time comes into contact with any part of an electrical circuit; or, should there be a defect in the insulation, the various metal enclosures associated with most electrical circuits, whereby some current may flow through the person's body from the circuit to the earth. An electric current automatically selects the path of least resistance and it is therefore obvious that the way to prevent a current passing through the body of a person is to provide an alternative path of such low resistance as to take substantially all of the current. This can be accomplished by connecting the parts in question directly to the earth by means of metallic circuits of suitable construction, generally known as "protective grounding". These circuits are called "safety circuits".

It is essential that a safety circuit be of sufficiently low resistance so that, under any conditions which may arise, there will be no serious tendency for the current to pass from the system to the earth through any other circuit, such as the body of a person or animal or through metallic circuits not designed to carry the current, such as metal lathing, small gas piping, and other metallic or conductive materials which may over-heat from the passage of the current, or which may cause arcing or sparking and become hazardous.

### Recommended Practices of N.E.M.A. on Protective Grounding

1—Wiring systems **should** be grounded "where" and "as" required by National Electrical Code.

2—Non-current carrying exposed metal parts of fixed equipment, etc. in industrial, domestic and other locations, should be grounded, with exceptions under certain conditions.

Such an allowable exception might be for outlet boxes, fixtures, etc., in rooms of frame dwelling where containing no metallic piping or fixtures connected thereto.

3 (a)—In industrial locations; except offices, public utility stations, and industrial usages which have certain conditions and are exempted therefore,—non-current carrying exposed metal parts of detachable (portable) equipment should be grounded.

Exempted, except in hazardous, extra hazardous and conductive locations are detachable appliances which are not operated above 150 volts and inherently are sufficiently safeguarded against probability of harmful leakage from their exposed metal parts to persons or objects, by reason of either (1) their infrequency of handling, (2) their assured degree of insulation between live parts and exposed metal parts or (3) their inherent characteristics, leading to improbability of exterior metal parts touching persons or objects in such a way as to harm them.

Examples (1) General purpose ventilating fans.
(2) "Approved" general purpose pressing irons.

3 (b)—In office, utility and dwelling locations and in all other locations except industrial ones, non-current carrying exposed metal parts of detachable equipment should be grounded where operating at over 150 volts.

3 (c)—In office, utility and dwelling locations and in all other locations, except industrial ones, non-current carrying exposed metal parts of detachable equipment, where operating at less than 150 volts, need not be grounded.

4—Conduit fittings, armored cable sheath with fittings, metal raceway with fittings, and a safety grounding wire suitably identified as such and run with the system conductors; may be used as the grounding medium for equipment grounding or as a portion of such grounding medium, "where" and "as" provided for in N. E. Code.

5—No current-carrying conductor of an interior wiring system should be used as a grounding medium or portion therefore, to ground fixed or detachable equipment.

Earth connections are made through earth electrodes, which may be the water supply system or artificial grounds, such as drive rods or pipes or other metallic structure buried in the earth. As the resistance to current flowing from the earth electrode to the earth is usually the greatest single element of resistance in the safety circuit, it is desirable that the earth connection of lowest resistance be used. Under most circumstances this will be the cold water piping.

Artificial grounds, as generally installed and as prescribed by the National Electrical Code, are of relatively high resistance, and when such electrodes are used the protection afforded by safety circuits is necessarily relative and not necessarily 100 percent perfect. Perhaps the greatest difficulty we have to contend with today in securing adequate protection, is that of securing sufficiently low resistance artificial grounds. The resistance of a single pipe or rod will more often be above rather than below 25 ohms, and with but one electrode available, it is a rather cumbersome proceeding to determine its resistance. On the other hand, if two electrodes are installed, spaced not less than 6 feet apart, and the two connected in multiple, we have an artificial ground of a little over one-half the resistance of a single electrode, and it is comparatively a simple matter to measure the resistance.

### Industrial Plant Installations

Fig. 1 is a schematic wiring diagram of industrial plant installations, in which the grounding is in accordance with N. E. M. A. recommendations. The power circuit, which is 3 phase 3 wire, and may be of any voltage from 220 to 550, is itself ungrounded, this being optional under the present National Electrical Code. The lighting circuit, 110-220 volt 3 wire is grounded to the cold water piping by a wire from the main switch.

It will be seen that the metal conduit, fittings, etc., are all connected together

and finally connected to the water piping system. The metal enclosures of all fixed equipment are presumed to be properly connected to the conduits leading thereto, while the metal enclosures of all portable tools and devices are connected to the conduit system by means of a safety conductor in the flexible connecting cords.

Rigid conduit construction is shown as a matter of convenience, but flexible conduit—armored cable or other metal raceways or wireways or any type of wiring approved for the condition concerned may be substituted. If the wiring is not contained in a metallic enclosure then a third copper conductor must be installed. This conductor, however, would not necessarily have to parallel the entire wiring system but need be installed only to connect the frames of the various pieces of equipment to the nearest water piping.

The effectiveness of any system of protective grounding depends upon its ability to provide protection under both normal and abnormal conditions and upon its ability to remain intact and in proper working order irrespective of such changes in the wiring system itself as are liable to take place in the normal course of operation. The most severe abnormal conditions are encountered when the higher voltage of a primary system, a series street lighting system, or a trolley feeder, finds its way to the secondary wiring, or when a failure occurs in the insulation of some appliance or wire or equipment which permits one of the conductors to come into contact with the metal enclosure. The more common changes in the wiring system which may be expected are the reversal of a pair of wires or the open circuiting of a conductor either by the blowing of a fuse or otherwise.

The principal possibilities of reversal lie in the necessity for occasional repairs to pole lines and secondary distribution systems, the changing and testing of meters and the repairs and changes in circuit wiring, flexible cords, etc. Circuit wires are often intentionally reversed to prevent the blowing of a fuse when a conductor has come into contact with a metal enclosure. This, be it noted, is one way of connecting a grounded circuit wire to the metal enclosure and is hazardous practice. Flexible cords are repaired and in many cases by laymen. Often no attempt is made to maintain a portable device and its cord as a unit but several extra cords are provided as spares.

When the safety circuit consists of the metal enclosure of the conductors there is little possibility of the safety circuit conductor and a working conductor being transposed. When a copper safety circuit is used it and its use are both obvious, and while electricians and laymen alike are accustomed to arranging two wires more or less indiscriminately, they are also accustomed to arranging three wires systematically since three wire circuits must be so arranged to be operative. Safety circuit conductors are clearly identified.

Open circuits we always have with us. Fuses, circuit breakers and switches are for that purpose and the Code permits their installation in the grounded conductor in some cases. Multiple pole switches and circuit breakers are not designed to open all poles at exactly the same instant nor to open the ungrounded wires first, and but a fraction of a second only is required to deliver a severe shock. Loose contacts are not uncommon especially in detachable devices, and open circuits in flexible cords are our principal problems with portable devices.

Under normal conditions the neutral or white wire, which is connected directly to the water piping system, is at earth potential, that is to say there is no danger of receiving a shock from touching this conductor or anything in contact with this conductor. All of the metal work is likewise at earth potential. Between each of the other wires of the system and the earth there is a potential of 110 volts or more, and a person touching either of these wires

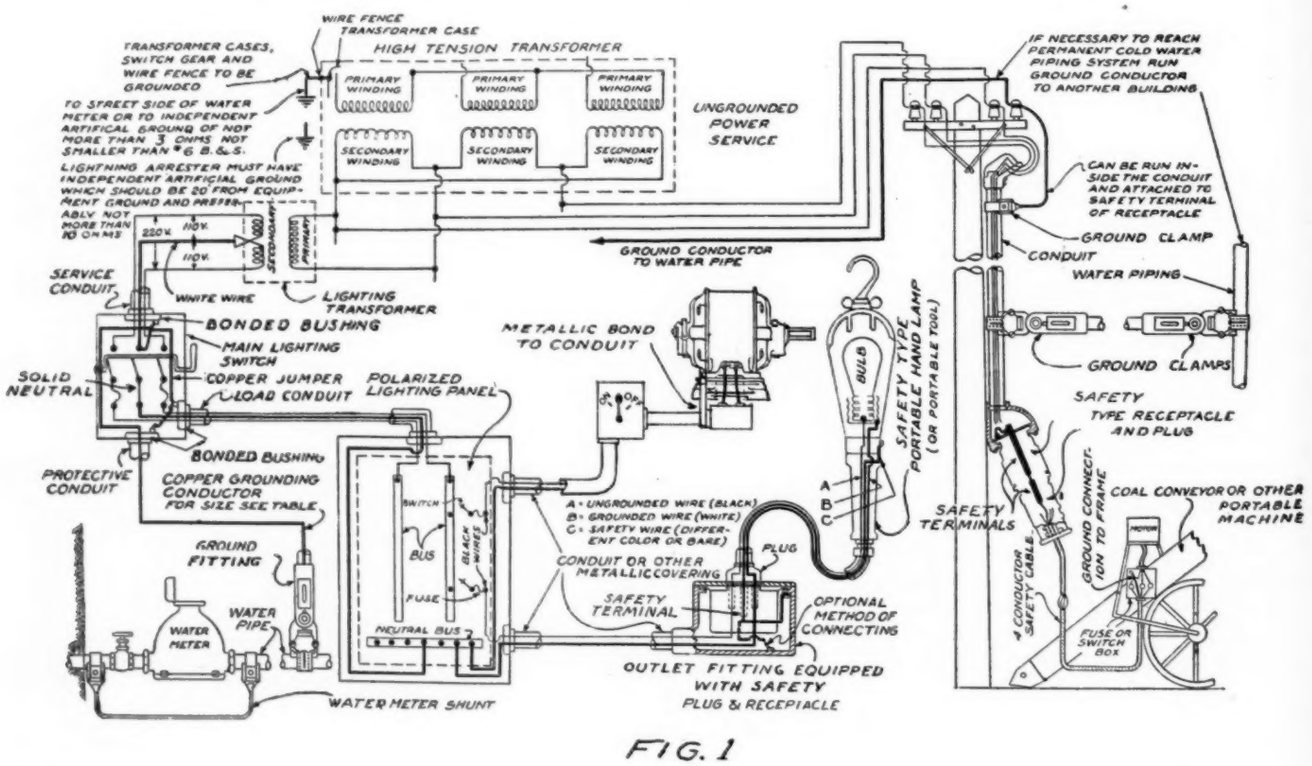



FIG. 1

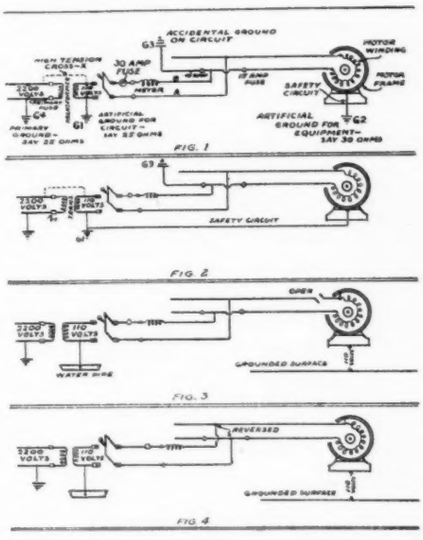
or anything in direct contact with these wires, is liable to receive a shock. There is no known method of effectively eliminating this latter hazard, but it may be reduced to a minimum by means of identified, polarized wiring.

### Rise of Potential

Assuming first that a high potential from the primary system finds its way to the secondary system, a flow of current will be set up through the ground conductor to the water pipe and thence to the street, and thence through other ground connections, to the primary circuit from which it started and this current will somewhere pass through primary fuses which may vary in size anywhere from 3 to perhaps 200 amp. Assuming the conditions to be such that the current flow is actually 50 amp. and that the resistance of the ground circuit is 2 ohms, then the grounded circuit conductor will be raised to a potential above ground of 50 x 2 or 100 volts, and the other conductors will have a potential above ground of 210 volts. The only way in which the rise of potential can be kept within safe limits is by keeping the resistance of the secondary ground circuit sufficiently low. However, where the N. E. M. A. grounding method is followed the equipment frames will remain at earth potential, unless a breakdown occurs in the insulation.

If the insulation on one of the ungrounded circuit wires becomes defective, and the circuit wire comes into contact with grounded metal enclosure, there would result a short circuit, which would blow the fuses in the ungrounded conductor unless the resistance of the safety circuit was high enough to keep the current below an amount sufficient to blow the fuses. With any of the metallic enclosures which are recommended by N. E. M. A. as suitable safety circuits this condition would not exist, except possibly in the case of an exceptionally long circuit of certain types. If the fuse does not blow, then the metal enclosures will immediately assume a potential above earth equal to that of the conductor with which it is in contact, again emphasizing the fact that the effectiveness of a safety circuit is dependent upon its resistance.

Or let us suppose that the grounded neutral conductor and one of the other conductors of the system are inadvertantly reversed. This reversal would have no tendency at all to blow the fuse but one of the conductors would now be at earth potential, the white identified wire would be at a potential of 110 volts to earth, and the third conductor would be at 220 volts to earth. This condition, however, would be quickly discovered because there would now be 220 volts between the white conductor and one of the others where there should be only 110 volts, and during the short time that the trouble existed the hazard would probably not be very serious because the frames of all the equipment would still be maintained at earth potential.




If for any reason whatever the grounded circuit conductor becomes open circuited at some point the safety features of the system, in the way of equipment grounding, are in no way affected, no hazard is created and the only effect is to injure or interrupt the service. If an open circuit occurs in a conductor of one of the safety circuits the usefulness of the safety circuit would be destroyed, but there would be no additional hazard created; that is to say the conditions would be no more hazardous than they would have been had no safety circuit whatever been installed.

So far, we have been dealing only with the situation where a general water system is available for the earth electrode, but since such systems are not always available we must necessarily consider those installations where it is necessary to depend upon artificial grounds.

Fig. 2 is a simple wiring diagram illustrating the proper method of utilizing such grounds. An artificial ground, G1, has been installed and permanently connected to one conductor of the secondary circuit just ahead of the main switch, and we will assume that this ground has a resistance of 25 ohms, which is probably somewhat better than the average artificial ground being installed today. The frame of the motor is grounded by being connected to a separate and independent artificial ground, G2, located at least 6 ft. from the circuit ground.

### Artificial Grounds

As previously pointed out, the protection afforded by the use of artificial grounds having a resistance in excess of about 3 ohms is by no means perfect, but the degree of protection which may be obtained is very much higher when separate and distinct grounding circuits are maintained than when a single ground is used for the grounding of both the circuit and the equipment which, of course, is necessarily the case, unless the grounded circuit wire is fully insulated from the metal enclosure of all equipment.

In an installation such as Fig. 2 (without G3) let us assume that the higher voltage of the primary circuit finds its way to the secondary wiring, as at x, and that the primary wiring is itself grounded through a resistance of 25 ohms, G4, the result would be a flow of current from the primary to the secondary, thence through the secondary ground, G1, to the earth, through the earth, and back to the primary circuit, through G4, the current flow being approximately 40 amp. The flow might be through a fuse, the operation of which might remove the hazard, or there might be no fuse in the circuit which would operate on this load, but in any case, so long as the condition referred to remains, each of the wires of the secondary system would have a voltage to ground of approximately 1,000 volts. The extent to which the secondary would be raised above earth potential depends upon a great many variable conditions, but it may be anything from nothing to practically the full voltage of the primary system.

Or let us assume that the normally ungrounded wire of the secondary system becomes accidenally grounded as shown at G3—Fig. 2 (without x). When this happens a circuit is established through which some current will flow, but since the resistance of the circuit ground itself is 25 ohms, the resulting

current would not exceed 5 amp., and in most cases would not result in the blowing of a fuse. When such an accidental ground occurs, however, both wires of the system immediately assume a potential above earth, and the voltage to ground will be inversely proportional to the resistances of the ground connections of the respective conductors. For example, in Fig. 2, if the resistance of the accidental ground G3 is 25 ohms, then the voltage of 110 volts will be divided equally between the two conductors and each conductor will have a potential of 55 volts to ground. If, however, the resistance of G3 should be zero or nearly so, then conductor A, which is the normally grounded circuit wire, would assume a potential of approximately 110 volts to ground, while conductor B would drop to approximately ground potential. In other words, an accidental ground on the ungrounded conductor produces a voltage between the permanently grounded conductor and the earth which may have a value anywhere from zero to the full voltage of the system to which the conductor is attached. In the case of Fig. 2 this is limited to 110 volts, but in the case of industrial establishments, where the 110 volt lighting and appliance circuits are often taken from auto transformers connected across 440 and 550 volt power circuits, and from multiwire systems, it is possible to obtain the full voltage of those systems between the supposedly grounded conductor and the earth.

#### Single Electrode Grounding

These conditions at first sight look rather serious, as they are, but it will be seen that these dangerous potentials are confined to the conductors, and it is not very probable that any one will come into contact with the conductors during the usually short period when such conditions exist so long as there is no breakdown in the insulation of the secondary system on either wire. The metallic enclosures will remain at earth potential when they are connected to a separate and independent ground electrode as G2 in Fig. 2. If, however, a single electrode only is used for grounding both the circuit and the equipment, as shown in Fig. 3, then the equipment would always have the same potential above ground as the conductor to which it is connected. With either of these methods a mere reversal of wires or the open circuiting of the grounded circuit wire would not result in any additional hazard.

#### Grounding the Motor Frame

In Fig. 4 the frame of the motor is grounded by being connected to the grounded circuit wire and, as has been pointed out, the motor frame will necessarily have the same potential to ground as the wire to which it is connected, which may be almost anything under abnormal conditions, and it has the additional objection that even when no abnormal voltage condition exists, and with all insulation intact, the motor frame would be placed at full potential to ground by the open circuiting of the grounded circuit wire as in Fig. 4, or by any reversal for instance as in Fig. 5. It is true that if the wiring has a metallic covering a reversal will usually blow the fuse, and thus eliminate the hazard, but with these types of wiring there is nothing whatever to be gained by this method of grounding. It must also be remembered that even with metallic coverings there is some possibility of the fuse not blowing, and even the short period which is required for the blowing of a fuse is a sufficiently long time to administer a very severe shock.

The suggestion that equipment might be grounded by connecting it to the grounded circuit wire as shown in Figs. 4 and 5 is receiving some consideration at this time. It has not been suggested that this system be used except in those cases where a general water supply system is available for the ground electrode and where the wiring system itself is identified and properly polarized, but if this type of grounding is permitted at all it seems very doubtful that it will be practical to confine its use within any such prescribed limits. The things we are most seriously concerned with just now is the grounding of portable equipment in industrial establishments, and considerable pressure is being brought upon these establishments by industrial boards, labor commissions and others to this end. As a matter of fact, none of the old wiring and very little of the modern wiring in industrial establishments is polarized but, on the other hand, the circuits are generally double fused and switched, which condition, of course, presents a constant possibility of the grounded circuit wire becoming open circuited.

By referring to Fig. 4 and 5 it will be seen that irrespective of whether the circuit wire is connected to an artificial ground or to a water piping system full potential will be placed upon the frames of the equipment if a reversal takes place, or if an open circuit occurs in the grounded conductor. Furthermore, the only difference between a water pipe ground and an artificial ground is a difference in resistance and, as a matter of fact, no definite resistance values can be assigned to either or, in other words, it is quite possible to have an artificial ground of relatively low resistance say less than 3 ohms while, on the other hand, it is quite as possible to have a high resistance water pipe ground, say higher than 25 ohms, and the chances of this are increasing constantly due to the increase in the practice of using nonconducting material in joints in water mains.

Such a grounding system nullifies those sections of the Code which prohibit grounding the circuit wire inside the main switch and the interconnection of neutrals, both of which requirements are important safety measures.

#### Objections

It would seem, therefore, that there are many serious objections to using the grounded circuit wire for grounding metallic enclosures even where water piping systems of known low resistance are utilized for the earth electrode. Where artificial or other high resistance grounds are used this method evidently increases rather than decreases the hazards. Its use is particularly dangerous in connection with wiring which is not enclosed in metal, which is very frequently the case with flexible cords of portable devices because a reversal of the circuit itself will not result in blowing the fuse.

It has been claimed by some that grounding to the circuit wire has an advantage in that an open circuit in that wire automatically gives a warning that the device is unsafe to handle because it becomes inoperative. This reasoning, however, does not appear sound. Failure to operate, to the operator, generally means a fuse blown or current off or something wrong with the tool and no particular warning at all is registered. In any case he is not aware of the inoperative condition unless he is using or trying to use the tool, generally under his normal working conditions, in which case he is subjected to the full hazard before he can possibly recognize any warning sign.

# Cost to Install Apartment House Meters

PRACTICE in the installation of metering equipment for apartment houses has become standardized to the extent that such installations usually consist of a bank of externally operated switches and tenants' meters mounted on a wood backboard with some system of bus conductors feeding to the switches. The details of the layout may vary considerably, depending upon the requirements of the local central station and upon the individual preferences of the contractor. Few contractors have made any special study of the cost of the labor for assembling this equipment. Records were kept of the labor on such an installation recently completed in New York City by Leo S. Stern and data of considerable value were secured even though the segregation of the labor was only approximate in some instances.

There are a total of 95 apartments in the building. The meters are grouped in two rooms in the basement, known as the east and west meter rooms. From the main distribution center a feeder is run to each meter room, where a sub-feeder distribution center is installed. From each of these centers 8 sub-feeders run to the meter switches. Each sub-feeder consists of three No. 6 cables and is run in 1¼-in. rigid or flexible conduit to the first switch. From this point on these conductors form the buses feeding the switches.

The service is D. C. and is supplied by the New York Edison Company, and at the present time is metered in bulk by master meters, the tenants' meters being the property of the owner of the building. It is possible, however, that at some future time the power company may take over the small meters and bill the tenants direct, and it was therefore thought best to install the equipment in accordance with the requirements of the company. There are four branch circuits in each apartment and the sub-feeder to each apartment consists of three No. 14 wires. To comply with the central station requirements the taps carried from the bus conductors to the meter switches and through the meters are No. 10 for the outer wires and No. 14 for the neutral, and the fuses in the meter switch boxes are 30 amp. From the meter switches No. 10 3-conductor armored cable is installed to an equipment box above the meters in which are installed cutouts with 15-amp. fuses to protect the No. 14 sub-feeders, the latter being carried to the floors above in rigid conduit.

The illustration is a view in the west meter room showing the complete assembly except that on the right-hand board there are six more meters and switches than are included in the picture. The inset is a view showing installation detail. The backboards are ¾-in. matched and beaded ceiling nailed to 2-in. by 4-in. uprights and are 7 ft. 3 in. high. The board at the left, below, is 12 ft. 6 in. long and the right-hand board is 7 ft. 6 in. long. The backboards were in this case erected by the general contractor so that no labor costs were obtained on this item. A record kept by Mr. Stern on another installation showed 8 man-hours for building a board of about the same size and construction as the larger of the two described here. In an article which appeared in THE ELECTRAGIST in July, 1926, 11 hours labor was reported as the time to build a similar board 7 ft. high by 19 ft. long.

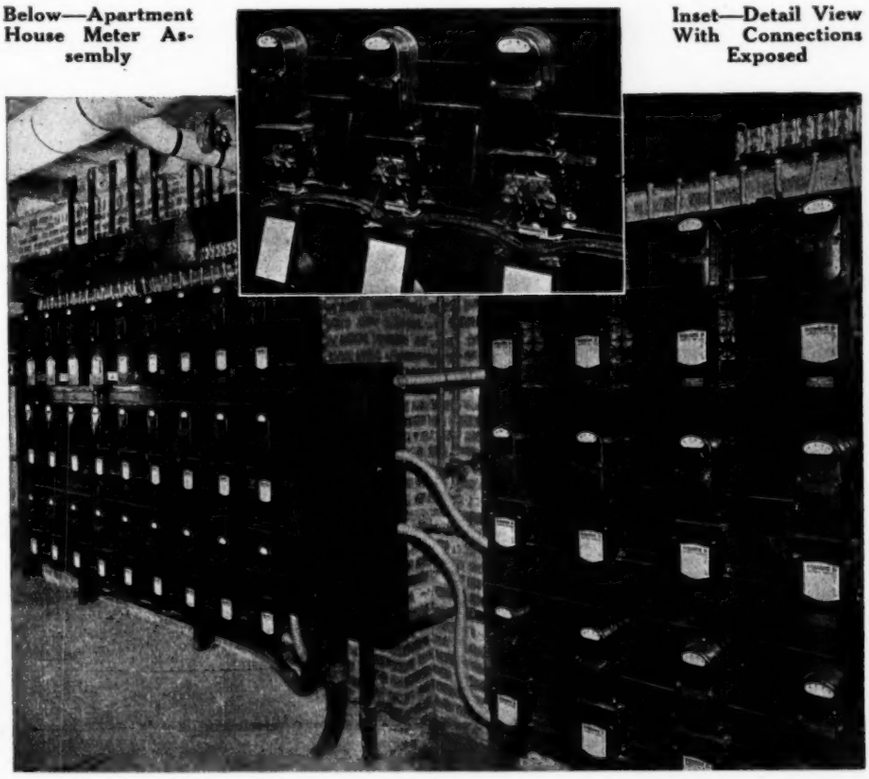
The meter switches used are Square D No. 57311 provided with meter trims and troughs for connecting between adjacent switches. The horizontal distance between centers of meters is 15-in., this being the standard spacing for D. C. meters adopted by the Edison company and the connecting troughs are of the proper length to provide this spacing.

The labor records included with other items the labor for installing rigid and flexible conduit from the distribution center cabinets to the meter switches, also for stubbing down the riser conduits from the ceilings in the meter rooms to the equipment boxes above the meters. This being special work which would never be done twice in the same way, this part of the labor was estimated as closely as possible and deducted, so that no labor on either the rigid or flexible conduit is included in the figures presented below. The total time allowed for conduit work is 75 man-hours.

The labor data given in the table is in man-hours and has been reduced to the time per meter for each of the items which were

**Below—Apartment House Meter Assembly**

**Inset—Detail View With Connections Exposed**



separately recorded. Where more than one operation was included in one item, the time has been apportioned to the individual operations by assuming units which are based on data previously determined and which are consistent with the records of this installation. The total time per meter is very nearly correct. The time per meter for each item may be high for some items and low for others, though if there are any such inaccuracies they are probably small. The split-up of the items into unit times per operation is necessary in order to produce data that may be used in estimating installations which are similar but differ in certain details. The sub-division of the time on each main item has been made with care and is approximately correct.

LABOR TABLE FOR INSTALLING APARTMENT HOUSE METERS

| Item | | Hours per Meter | Number of Operations | Hours per Operation |
|---|---|---|---|---|
| 1 | Mount Meter Switch | .58 | | |
| 2 | Mount Meter and make 10 connections | 1.16 | | |
| | Mount meter only | | 79 | .58 |
| | Connecting | | 790 | .06 |
| 3 | Install Meter Sub-Feeders & Buses | 1.14 | | |
| | Sweat lugs on No. 6 cable | | 48 | .41 |
| | Tap No. 10 & No. 14 to No. 6 | | 288 | .25 |
| | Connect No. 10 & No. 14 to switches | | 288 | .06 |
| 4 | Install Equipment Boxes | .24 | | |
| | Box 12" x 30", 6 cutouts | | 2 | 2.70 |
| | " 12" x 75", 15 " | | 1 | 3.70 |
| | " 12" x 90", 18 " | | 1 | 4.00 |
| | " 12" x 105", 21 " | | 1 | 4 50 |
| | " 12" x 150", 30 " | | 1 | 5.40 |
| 5 | Install 3-cond. No. 10 Arm. Cable and Make 6 Connections | .58 | | |
| | Per length of cable, less connections | | 94 | .22 |
| | Per connection | | 564 | .06 |
| 6 | Test and Connect Risers | .25 | | |
| | Test, per wire | | 288 | .023 |
| | Connect, per wire | | 288 | .06 |
| | Total | 3.95 | | |

Average rate of wages, $1.34 per hour.
Labor cost per meter, 3.95 hr. at $1.34—$5.29.

## Discussion of the Data

*Item 1—Mount Meter Switches.* This time appears to be somewhat high, both as compared with data from other sources and as compared with the time for mounting meters.

*Item 2—Mount and Connect Meters.* This includes 10 connections per meter, each point where a wire is connected being considered as a "connection." The allowance of .06 hr. or 3.6 minutes per connection used throughout this table is taken from other sources and seems to give consistent results.

*Item 3—Install Meter Sub-Feeders.* An allowance of 25 hours for labor on rigid and flexible conduit was deducted from the total reported on this item. The remaining time checks very well with other data.

*Item 4—Install Equipment Boxes.* The contractor estimates that 50 hours was required for nippling riser conduits down to the boxes and this time has been deducted from the total reported on this item. The boxes were furnished at the job with the cutouts mounted. No connecting time is included here.

*Item 5—Install and Connect Armored Cable.* The length of cable used has no bearing on the labor in such a case as this; the time is consumed in cutting the cable, stripping the armor from the ends, connecting the cable to the boxes and connecting the wires. Making the standard allowance of .06 hr. per wire connection, the time for cutting, stripping and applying connectors is somewhat high as compared with records of the same operations in house wiring.

*Item 6—Test and Connect Risers.* Evidently very little time was required for testing, but the contractor believes that the above record is correct on this item.

Data obtained from a record of one installation is never conclusive, but is vastly better than no data at all. No great difficulty was experienced by the contractor in securing this time record and even better results would be secured with no greater effort if the same workmen were to report their time on another similar installation. Fifteen or twenty records of different jobs of this general type would make it possible to determine the unit times for all operations quite accurately. From these units data could be worked out in very simple and convenient form for use in estimating, preferably in the form of total hours per meter for every type of construction that is commonly met in practice.

## Handling "Work in Progress" on the Books

There are several different ways to put the billing on work in progress thr ugh the books of an electrical contracting company. Following the usual practice the John R. Proctor Company, Bayonne, N. J., arranges its monthly billing on fixed price contracts generally on a monthly basis. In some cases a certain percentage of the amount due is withheld until the job is completed. The billings are for the work installed, that is, the cost of labor and material, plus the estimated overhead and profit on the job.

If the cost of labor and material on one job for one month is, say, $3,000 and this contract includes 20 per cent and 10 percent of cost as overhead and profit, the amount billed, if satisfactory to the engineer, is:

| | |
|---|---|
| Cost | $3,000 |
| 20% Overhead | 600 |
| Total | $3,600 |
| 10% Profit | 360 |
| Amount Billed | $3,960 |

This is handled in the accounting system just as if it were a completed contract for which the cost of labor and material is $3,000 and the selling price is $3960 leaving a gross profit of $960.

If there is any doubt as to the amount of monthly billing which will be allowed the matter is referred to the engineer on the job first. Mr. Proctor estimates that about 30 percent of his contracts include the withhold clause.

# Laniape!

PEOPLE laughed when J. A. Fowler, past president of the Association of Electragists, told the members of the National Electric Light Association at their convention last summer of the old French custom in Louisiana called "Laniape"—the giving away of something with every purchase. It began by giving a piece of candy to children with each purchase and gradually spread, as competitors forced merchants to increase the laniape until it stopped just short of giving away a pair of pants with each pair of suspenders. Seeing this custom about to be revived in the electrical industry Mr. Fowler asked where the central station practice of giving things away with appliances—flour with waffle irons, coffee with percolators, etc.—was going to stop "with an oriental rug with each vacuum cleaner?"

He apparently wasn't so far off, after all, for on December 22 the Hartford Electric Light Company announced an axminster rug with each vacuum cleaner of a certain make. Mr. Fowler, however, admits his power of forecasting was not capable of even dreaming that any power company would hold a grab-bag dollar day such as the Ohio Public Service Company did and sell electric ranges for one dollar.

Both of these sales were announced in the daily papers in large advertisements, which are reproduced below. Two other advertisements, one by the Commonwealth Edison Company and one by the People's Power Company, are reproduced to show how widespread this custom has become.

These are some of the practices that cause dealers to be discouraged, that break down every effort towards better trade relations, that prevent the industry from getting ahead.

Dealers can not compete with cut prices, and laniape is but a form of price cutting. Electrical contractor-dealers expect certain forms of price cutting from department stores and other non-electrical outlets, but they look to the central stations for leadership in better sales practices.

Can it be that electrical appliances are not necessities and the public must therefore be laniaped into buying them? or;

Are these practices the measure of central station salesmanship?

# Analysis of Proposed 1928 Code Revisions

By ARTHUR L. ABBOTT,
Technical Director, A. E. I.

IF all the proposed changes in the National Electrical Code are adopted at the meeting of the Electrical Committee to be held this month, contractors will have to learn their way around in a Code about one-third larger and including a dozen brand new features as well as numberless changes from the old rules.

Code rules are made by the Electrical Committee of the National Fire Protection Association. This committee has 43 members representing 23 organizations. From the membership of the main committee, 32 sub-committees are made up, each sub-committee taking charge of one article of the Code. The article committees have for many months been making intensive studies of their respective sections with a view to thorough revision of the entire Code, and their reports which have just been issued in printed form, will be submitted to the entire Electrical Committee for final action. Many of the changes, of course, are purely editorial in order to clarify certain sections. This analysis discusses all of the important changes and additions.

In Article 4, it is required that service wires shall not be smaller than No. 8. Another point of interest is the provision that in a building served through 2, 3 or 4 meters from a single service, if the voltage to ground does not exceed 150 volts, the service conductors may be run direct to a separate service switch for each meter.

### Article 5 Rewritten

The entire revamping of Article 5 on Wiring Methods is perhaps the most striking and most important of the proposed changes.

The old Article 5 begins with the sub-title "Open Wiring" and launches at once into the prosaic statement that "Supports shall be composed of non-combustible, non-absorptive insulating material," etc., etc. In the revision the subject is changed to Wiring Types, Systems, Methods. It is first stated that "This article treats only of types of wiring recognized as suitable and of the conditions and methods of installation under which they are suitable." The recognized types of wiring are then listed.

### "Where"

A very desirable innovation is introduced in the rules for most of the types of wiring by preceding the installation rules for each type with a clear statement of the location "where" and the conditions "under which" this type of wiring is approved for use. The types so treated are Knob and Tube, Conduit, Surface Metal Raceways, Combination Surface Metal Raceways and Armored Cable. Specific rules are given governing where and under what conditions Non-Metallic Sheathed Cable, Bare Conductors and Underfloor Raceway may be installed, but unfortunately the logical arrangement of the other sections has not been followed. The rules governing each type of wiring fall naturally into three divisions: first, the locations where and conditions under which the type of wiring may be used; second, the specifications for the material itself and third, the rules for the installation of the type. The proper grouping in these three divisions would help greatly to clarify the rules. Besides the neglect of this logical method of arrangement, the section on conduit work is further complicated by the inclusion of both rigid and flexible conduit in the one section. A step has been taken in the right direction in this proposed revision by placing all rules for the installation of conductors under the various types of wiring in Article 5, the article on Conductors covering only the specification for the various types of conductors as materials.

The present Code includes only one paragraph on combination raceways for both lighting and low tension wires. This type of wiring is given much more space and is quite completely covered in the new Article 5. The arrangement of this section is particularly commendable. The conditions which make the type of wiring permissible are first stated, specifications for the material follow, and then the installation rules are given.

It is not evident what the intention may be with respect to wood molding. This is included in the list of recognized types of wiring but no rules are given.

Rules for underfloor raceways are much the same as those in the 1927 Supplement with some amplification.

Slightly greater latitude with respect to occupancies is permitted in the rules for non-metallic sheathed cable. It is required that the cable shall contain in addition to the circuit conductors a non-insulated conductor "for grounding purposes." The purpose of this grounding conductor is explained in the article on grounding.

### Interior Electrical Systems

A new section is added to Article 5 with the heading "Interior Electrical Systems" which treats of identified conductors in such a way as to make the requirements clear and easily understood. An important detail here is a rule that no identified wire may be connected to a single pole switch. This will require for a switch loop of two conductor armored cable or non-metallic sheathed cable that the white wire be painted black at the switch.

Though as old as any other type of wiring, bare conductors are for the first time recognized in this report as a distinct type. Bare conductor wiring, under these proposed rules, may be used only in fire-proof buildings, must not be used in hazardous, extra-hazardous or "corrosive" locations, and only for "risers or feeders". The terms "corrosive location," "riser" and "feeder" are not defined here or elsewhere in the report. The rules cover all details of installation, taps, current density in the copper and at contact surfaces, and spacing.

One of the most radical departures from previous practice and precedent in making Code rules is the inclusion

in Article 5 of a section dealing with demand factors, entitled "Wiring Layouts".

The method of handling the subject of demand factors for lighting and appliance loads is logical and scientific. For each class of occupancy a standard load is specified in terms of watts per square foot of floor area, the actual connected load being disregarded altogether. Demand factors are then applied on a sliding scale, the factor decreasing as the area increases. For example, in an office building the standard load is 2 watts per square foot. For any area up to 10,000 sq. ft., the demand factor is 100 percent, and for all excess above 10,000 sq. ft., the factor is 70 percent. Thus if the total area is 100,000 sq. ft., the standard load for the first 10,000 sq. ft., is 20 K. W. and the demand factor is 100 percent. For the remaining 90,000 sq. ft., the load is 180 K. W., and the demand is 70 percent or 126 K. W. The total load is 200 K. W. and the demand is 146 K. W., or the net demand factor for the entire installation is 73 percent. Data is provided to apply to all common classes of occupancies except theatres, churches and other places of public assembly; in these cases the sub-committee are not yet prepared to submit data.

#### Branch Circuits

The watts per square foot specified for various occupancies will determine the least number of branch circuits which may be installed to supply a given area; thus a lighting circuit shall supply current to no greater area than will demand 1200 watts, hence in an office building at least one lighting branch circuit is required for each 600 sq. ft. of floor area. Six different types of branch circuits are recognized: lighting circuits, appliance circuits, lighting and appliance circuits, special lighting circuits, special appliance circuits, individual heater or appliance circuits.

A single conductor may be used as the neutral for three 3-wire feeders or for two 4- or 5-wire feeders. The demand factor applying to the outer wires may be applied to this combination neutral and in a 3-wire system a further demand factor of 70 percent may be applied when the current in each outer wire is more than 200 amp. The same rule applies to a conductor serving as the neutral for one 3-wire feeder.

Demand factors are given for range loads and wire and fuse sizes are specified for branch circuits to ranges.

In determining the size of any set of conductors supplying any number of motors up to and including 5, the conductors must have a carrying capacity equal to the total of the full load running currents of all the motors. For a larger number, the maximum demand is to be considered the total of the full load currents of the 5 largest motors, plus 75 percent of the total for all the others. This rule is somewhat puzzling when applied to certain specific cases. Suppose that a feeder is to supply two motors, one 3 H. P. and one 30 H. P., both squirrel cage 220 volt 3-phase. According to a table in this report, the full load running currents are 9 amp. for the 3 H. P. and 77 amp. for the 30 H. P., or a total of 86 amp. and the size of wire required for the feeder would be No. 2, protected by a 90 amp. fuse. But according to another table in the report the branch circuit to the 30 H. P. motor must be No. 1 and to hold the starting current of the motor 175 amp. fuses must be used. It is quite evident that the size of the feeder determined by the rule is not right, but one is left altogether in the dark as to what ought to be done.

In a number of places in this section the term "diversity factor" has been used. If the A. I. E. E. Standards can be taken as an authority, the term "demand factor" should be used throughout.

The addition of this section will be welcomed by contractors who have been compelled by some inspection departments to install excessively large conductors; however, there is a fly in the ointment in the shape of a note which reads:

> If at the time the equipment is put in service it shall be found that the conductors are of insufficient capacity to carry the maximum demand without overfusing they shall be increased in size to comply with the requirements for overload protection applying thereto.

#### Demand Factor Data

In other words, the contractor must take his own chances on the demand factor data working out right. No doubt such a provision is unavoidable, at least until the data has had a thorough trial in actual practice, and after all the contractor's chief complaint has been that he was compelled to install copper sufficient to carry the total connected load in cases where he was certain that a demand factor less than 100 percent could safely be applied.

Another new section of Article 5 requires the installation of "appliance circuits" and "special appliance circuits" in kitchens, dining rooms and laundries in dwellings.

The proposed rules for thin wall tubing were published in THE ELECTRAGIST in January. These rules had not been finally revised by the Article 5 Committee at the date of publication of the report.

As mentioned before, Article 6, Conductors, now contains only specifications for the materials, all installation rules having been transferred to Article 5. The article has been rearranged and renumbered.

#### Outlet Boxes

In Article 7 it is required that outlet boxes for concealed work in new buildings shall be at least 1½ in. deep, except that where the installation of such a box would result in injury to the building structure the depth may be reduced to ½ in. Also, that in new work no boxes may be fastened to wood, metal or composition lath.

The outstanding feature of Article 8, Automatic Protection, is the tables for selecting wire and fuse sizes for motor branch circuits. These tables were published in this magazine in April, 1927. A brief examination of this data indicates that for 220 volt squirrel-cage motors of the smaller sizes, wire sizes permitted are two or three gauge numbers smaller than are allowed under the present Code, and that there is no change for 40 h. p. and large motors.

#### Grounding

Article 9 on Grounding has been completely rewritten and contains much new material.

Permission is given central station companies to use a single grounded conductor as a common neutral for both primary and secondary street mains, under certain definite restrictions.

A new rule, No. 904-a, reads as follows:

> Exposed non-current carrying metal parts of fixed equipment, such as the frames and metal exteriors of generators, motors, transformers, controllers, fixed appliances, fixtures, conduit, armor of cable, metal raceways, and the like, shall be grounded.

The context plainly indicates that "and the like" includes cabinets, cutout boxes, outlet boxes and switch boxes.

Certain exceptions to this rule are stated in the next paragraph, but there are no exceptions in an industrial establishment nor in moist, corrosive, hazardous, extra hazardous or "conductive

locations." It thus becomes of particular interest to learn that "conductive locations" are:

1. Any room, all or part of which is below normal ground level.
2. Laundries, kitchens, bathrooms.
3. Ground floors of garages, stables and outbuildings with earth or concrete floor.
4. Rooms having floors, walls or ceilings containing metal lath, metal reinforcement or metal covering.
5. Any particular location so designated by the authority having jurisdiction.

All outlet and switch boxes in the locations listed in this definition must therefore be grounded. Conduit, metal raceway, and the armor of armored cables are considered as suitable grounding conductors for this purpose. The separate grounding wire required in non-metallic sheathed cable is to be used for this purpose; nothing is said, however, about the method of connecting this grounding wire to the outlet box, which is certainly an important detail. It is clear that in knob and tube wiring special grounding conductors must be installed in order to ground the outlet boxes in these conductive locations. It is not definitely stated what size these grounding conductors shall be; apparently No. 16 might be used in some cases. There are no rules specifying what size these grounding conductors shall be, how they shall be installed or how they shall be connected to the outlet boxes.

A new rule states that connection of conduit to boxes and cabinets by means of locknuts and bushings is not considered as a satisfactory grounding connection for service conduits, nor for any conduits where the system operates at over 150 volts to ground. Bonding jumpers must be used in such cases. Sizes of wire are specified for grounding service conduits.

### Grounding Portable Equipment

A new section is added to Article 9 on the subject of grounding portable equipment in industrial establishments. It is provided that electrically operated portable devices shall have their exposed metal parts grounded by means of a grounding conductor in the cord or by means of metallic armor on the cord. The extra conductor in the cord is well named the "safety conductor." The attachment plug and receptacle will of course require an extra pole for the grounding connection, this pole in the receptacle to be grounded by connecting to the conduit or cable armor.

In Article 10, rotating machinery and its control apparatus, a new rule requires metal terminal housings on fixed motors if they are accessible to unqualified persons and if the wiring is in metal. Somewhat more specific rules are given, including some changes, for disconnecting switches for motors. All motors of 5 h. p. and larger must be equipped with low voltage release attachments, except when a knife or snap switch is used as the controller for the motor. Evidently the term "controller" is used here as meaning an across-the-line type of starter, and it would seem that this rule discriminates in favor of the knife or snap switch.

### Control Circuits

A new section in this article reads:

The control circuits of electrically operated speed limiting devices and remote control switches shall be put in conduit.

Being in the article on rotating machinery, this rule may mean only that the control circuit of remote control switches must be in conduit when the switches control rotating machinery, and then again it may apply to the circuits of all remote control switches used for any purpose. It would seem that a point had been left open here for "interpretation."

All specifications for the construction of switches, except the tables of spacings and break distances, are omitted from Article 12. It will still be permissible under these proposed rules to install knife switches out in the open and not in cabinets, under certain favorable conditions. The old rules for mounting surface type switches are to be retained.

In Article 14—fixtures, sockets, etc.—a rule is included to the effect that combination gas and electric fixtures shall not be used. It is provided that receptacles of the Edison base type shall be used only for lamp holders.

The title of Article 16 is changed from "Electrically Heated Appliances" in the present code to "Electrical Appliances," thereby greatly broadening the scope of this article. It is explained that the article is to apply only to appliances for domestic or general commercial use, and suitable for attachment to lighting or appliance circuits.

Each cooking or baking appliance of more than 1,320 watts rating, and each appliance of over 2,200 watts rating must be wired on a separate branch circuit and each must be separately controlled by an indicating switch or by an attachment plug and receptacle. When the switch is installed it must be readily accessible to the operator of the appliance.

The metal frames of cooking or baking appliances rated at more than 1,320 watts must be grounded.

### Storage Battery Rooms

In Article 18 wiring in storage battery rooms is permitted to be in non-corrosive conduit instead of being limited to open work as in the present Code. Rules are added covering guards and enclosures for large batteries.

Article 32. The title of this article is changed from "Extra Hazardous" to "Hazardous and Extra Hazardous" locations. The article is considerably expanded. Three classes of location of varying degrees of hazard are now recognized with special rules for each class. The requirements are not greatly different from those of the present Code, but are very much more complete and explicit.

### Low Voltage Circuits

The title of Article 40 is made more specific by changing it to "Isolated Plants, 0-50 Volts," and the entire article has been re-written.

In designing circuits to operate on such a low voltage system each lamp socket and receptacle must be assumed to have a load of not less than 40 watts. Receptacles of 20 amp. rating must be provided in kitchens, laundries and similar locations. No light and appliance circuit may supply more than 300 sq. ft., in a residence, nor more than 500 sq. ft. in other occupancies. No residence of over two rooms may have less than two circuits, one of which shall be a light and appliance circuit and the other for appliances or convenience outlets. No wire smaller than No. 12 may be used.

The title of Article 50 is changed to read: *Circuits and equipment Operating at More Than 600 Volts Between Conductors.* There are numerous changes and the article is much longer than the present Article 50. The changes are not of a radical nature, but the requirements are somewhat more rigid and are much more complete.

NOTE: *Next month* THE ELECTRAGIST *will publish a report of the Code changes passed by the Electrical Committee on February 13-16.*

# Advertising the Motor Shop--II

| | | |
|---|---|---|
| Directories | Magazines | Athletic Teams |
| Newspaper Display | Circulars | Novelties |
| Newspaper Classified | Booklets | Exhibitions |
| Sales Letters | Hand Bills | Stickers |
| House Organs | Radio Station | Postcards |
| Programs | Name Plates | Shipping Tags |

By HARR F. RANNEY

A FEW motor repair shops advertise with house organs. One of these, S. J. O'Brien, Inc., New York City, issues a monthly "Electrical News Letter" which is a four page 8½ in. by 11 in. newspaper-style publication. The first page is written by Mr. O'Brien, who describes it thus: "I try to write something personal about our different customers; that is, if they open a new store, I mention it, tell of the good qualities of its proprietor, and then mention that we did the wiring. If any incident occurs to people with whom we do business I make some mention of it. These letters are not mailed to the company but to individuals. We sometimes send as many as ten to one concern. We find that many people look for it; first, for the news that may be in it; and secondly, to see if we write something about them. We can trace quite a few jobs to this little piece of advertising. Some write in and criticise it, others praise it. The main thing is they read it."

The last three pages of the house organ are devoted to short articles, poems and items about things electrical which would be interesting to the average non-technical reader.

*The Power and Light Bulletin* is published by the Miller Seldon Electric Company, Detroit, every two months. This is a 28-page 4 in. by 7 in. booklet with an attractive blue cover on which the feature contents of the issue are listed. Six pages are devoted to short, interesting items, while the rest of the book contains a catalog of motors for sale, with a description and price of each of the new and "renewed" motors in stock.

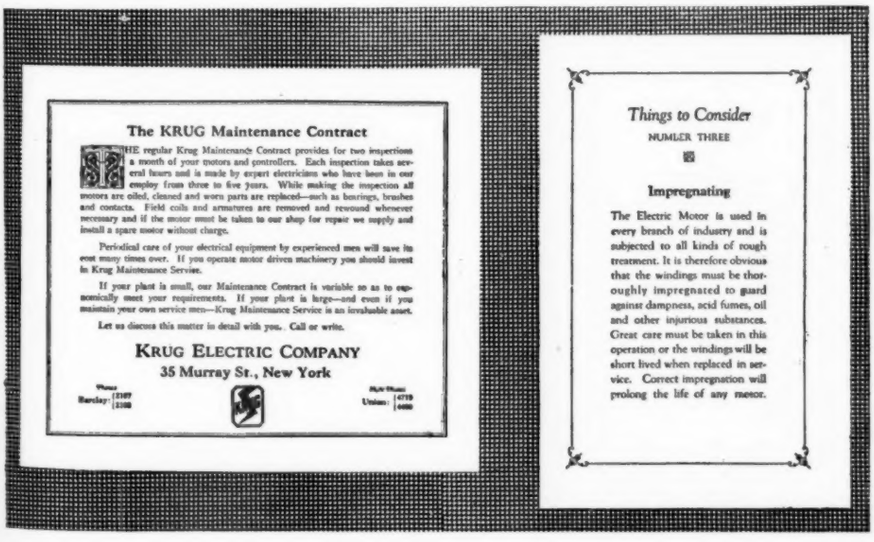
Goodwin-Pray, Inc., Newark, N. J., published a very attractive booklet, distributed to prospective customers, which they call *Things to Consider That Make the Re-building of Electric Motors and Generators a Subject for Serious Thought.* On the left hand pages of the booklet are half-tone illustrations of departments of the shop, and opposite are descriptions of the duties of the departments and the skill required for perfect repairing of motors. At the end is the warranty of the company which reads: "Each re-conditioned motor is guaranteed to be free from all electrical and mechanical defects and to do the work for which it was intended by the manufacturer for a period of one year."

A booth at the Graphic Arts exhibition, New York City, was employed by the Krug Electric Company of New York, which specializes in the repair of printing plant motors, to sell their services. At the exhibition they distributed a booklet descriptive of Krug service, an attractive two-color booklet full of testimonials from printing and bookbinding companies for whom they have done work.

A sticker is fastened by the tip on every sales letter that goes out from the Worth Electric Company, New York, which gives the name, address and telephone number of the concern. This sticker can be kept in a convenient place by the prospect and when need arises he will have the phone number handy. In order to make more certain that the prospect will keep the sticker Charles Liebov, owner of the company, has his bookkeeper (who writes all his sales letters in her spare time) write "KEEP THIS" in capital letters just above the sticker.

The Sterns Electric Equipment Company, Inc., Buffalo, has used a sales letter with good results which reads as follows:

"Subject: Electrical Machinery. Gentlemen: Any defective part of your electrical equipment may cause you great loss of production; quick repairs will prevent this loss.




**Booklets**

**Left, two pages from the 24-page booklet published by the Krug Electric Company for distribution to prospects at expositions and through the mail. Right, one page from the 18-page booklet of Goodwin-Pray, Inc., describing their motor repair service.**


**Trade Figures**

**These advertising figures help to visualize the spirit of service. Left to right: Doc Pep, of the Findley Electric Company, Minute Man and Electra, of the Maintenance Company.**

"We specialize in the repair of electrical machinery—our repair shop is the most modern in Western New York; fully equipped with the latest labor saving devices which reduce our cost to the lowest point consistent with quality, and which enables us to give you prompt service. Any time you have any equipment of this kind to be repaired or rewound just call on us.

"When you are considering the purchase of a rebuilt or new motor, transformer, or generator, telephone or write us for quotations. We carry a large stock of various sizes and can make immediate shipment.

"We know that you will be well pleased with STERNS SERVICE."

The Western Elevator and Motor Company, Winnipeg, Canada, regularly mails out a 6 in. by 12½ in. card with a list of new and used electric motors it has in stock, with the price of each motor. These may be filed by the purchasing agent or may be tacked on the wall where the information will be easily available when needed by the prospect.

A very good idea is used by the M. H. Salmon Electric Company, Inc., Syracuse, which specializes in industrial plant and substation work. They have a double postcard printed on heavy stock which is a combination postcard addressed to their office and a shipping tag addressed to the repair shop. The salesmen try to have these cards placed in the shipping rooms of factories likely to have motor repairing work. Whenever a plant desires to have a motor repaired or replaced by a new one they tear the postcard apart, filling out one side for the Salmon office, telling the date shipped and whether the motor is to be repaired or sold, and tacking the shipping tag half to the boxed motor. Since this is very convenient for the plant's shipping department it results in a considerable amount of business.

A "repair shop in the window" is the unique advertising idea used by the Findley Electric Company, Minneapolis, Minn., which has proved very successful. In this campaign one of the shop workmen with a complete repair shop for small appliances, small motors and fans was placed in the window where the passersby could watch. Curious crowds gathered in front of the window and the idea was conveyed that anyone with work to be repaired could bring it in and deal directly with the men doing the work. T. W. Findley, general manager of the shop, states that the idea was a great success, and they expect to repeat it every spring and fall. To make the idea more effective a postcard describing the "shop-in-the-window" was mailed to a selected list of 5,000 names.

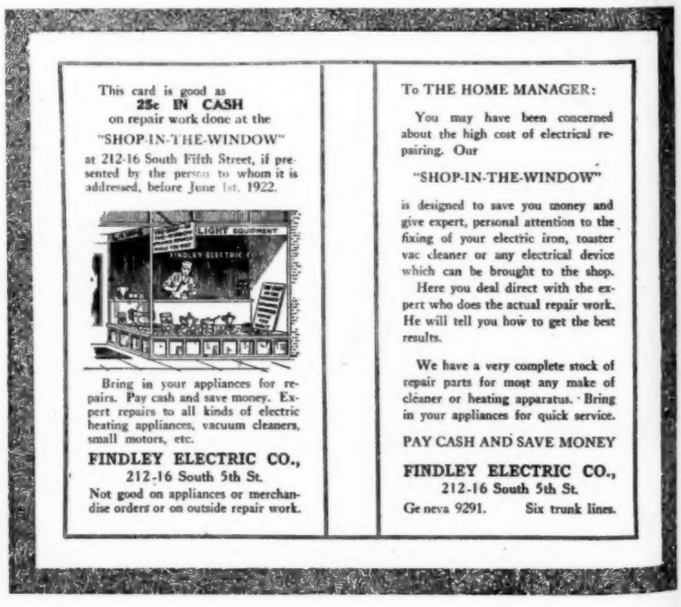
Motor men find it difficult to check the results of their advertising, most of them making no attempt at all to find out what method is the best for their particular situation. A few good methods are in use, however, the best of which is to ask every new customer how he happened to become a customer. The best test of the value of advertising is the actual sales.

One motor shop which does a lot of direct-mail selling keeps a list of customers and a list of prospects on file cards 3 in. by 5 in. Whenever a new customer is obtained the card is transferred from the prospect list to the customer list. If several new customers are obtained after one letter goes out and before the next letter is mailed they are credited to that particular letter. Thus the owner is able to build up a set of letters which have been tested and have produced good results. These can be used over and over again at intervals of six months or a year.

Who should prepare the advertising for the motor shop—the owner, one of his salesmen, the manufacturer, or an outside advertising agent? The answers are interesting: 79 percent prepare their own advertisements and sales letters; 11 percent make use of the advertising matter supplied by the manufacturers of the motors they sell, and 9 percent hire outside advertising experts to prepare their copy. Harry Crowe, Tulare, Cal., either prepares his own advertisements or has one of his salesmen do the job. "Poor advertisements had better never be presented," he says, "because adverse results ensue. I do not like 'special advertising men's' advertisements. They lack individuality. Retailers' ads should be provincial."

**Window Advertising**

**The repair-shop-in-window of the Findley Electric Company proved a money maker. It was advertised by mailing this double postcard.**



This card is good as
**25c IN CASH**
on repair work done at the
"SHOP-IN-THE-WINDOW"
at 212-16 South Fifth Street, if presented by the person to whom it is addressed, before June 1st, 1922.



Bring in your appliances for repairs. Pay cash and save money. Expert repairs to all kinds of electric heating appliances, vacuum cleaners, small motors, etc.

**FINDLEY ELECTRIC CO.,**
212-16 South 5th St.
Not good on appliances or merchandise orders or on outside repair work.

To THE HOME MANAGER:

You may have been concerned about the high cost of electrical repairing. Our

"SHOP-IN-THE-WINDOW"

is designed to save you money and give expert, personal attention to the fixing of your electric iron, toaster vac cleaner or any electrical device which can be brought to the shop.

Here you deal direct with the expert who does the actual repair work. He will tell you how to get the best results.

We have a very complete stock of repair parts for most any make of cleaner or heating apparatus. Bring in your appliances for quick service.

PAY CASH AND SAVE MONEY

**FINDLEY ELECTRIC CO.,**
212-16 South 5th St.
Geneva 9291. Six trunk lines.

The amount of money to be spent each year on advertising varies widely among motor shops, ranging from a minimum of $100 a year to a maximum of $6,000 a year. Thirty-two percent spent $1,000 or more on all forms of advertising; 30 percent spend between $500 and $1,000, while 30 percent appropriate less than $500 a year. When this is interpreted as a ratio of expense to sales volume it is found that the average for 39 motor shops was 1.4 percent of the total sales volume spent for advertising. The highest amount reported was 5 percent of the sales volume, while the lowest was .006 percent. Seventy percent of the 39 motor men spend more than 1 percent of their sales volume on advertising. The percent of sales volume spent for advertising is about the same for the small shops as for the large ones.

# Merchandising Campaign Produces New Motor Accounts

A COMPLETE merchandising campaign, which combined several advertising elements, and produced a number of new accounts at small cost per account, was carried out by the Findley Electric Company, Minneapolis, Minn. Stickers, direct-mail sales letters, the telephone, salesmen and postcards were all used in this forceful effort to produce new business.

FROM FINDLEY ELECTRIC COMPANY MINNEAPOLIS MINN.

T. W. FINDLEY, President & General Manager
S. H. FINDLEY, Secretary & Treasurer
214-216 South Fifth Street

Dear Sir:

Following up our talk with you concerning electrical repair service, we agree with you that there is plenty of opportunity in the service which is being rendered in electrical repairs at the present time.

You would be interested to know the large number of excellent suggestions that we have received from our customers as to ways of giving more complete service in electrical repairing.

It was at the suggestion of one of our customers that we established the inspection service which has become so popular. It is the best kind of insurance against shut-down.

The addition of two more service men has enabled us to give immediate breakdown service, and the large number of motors, controllers and spare parts of all kinds which we have on hand insures quick action and minimum cost.

Why not use our service from now on? A trial will convince you.

Phone Findley. Geneva 9261.

LOOK UNDER THE LABEL

This label will look good on the cover of your telephone book. It will remind you.

FINDLEY ELECTRIC COMPANY

T. W. Findley

General Manager

DOC "PEP" Electrical Specialties

First a list of all the industrial plants in Minneapolis was compiled and put on index cards which could be handled conveniently. A young salesman was employed to develop this list of industrials and get immediate and future business from them. His first effort was to sit down at a telephone and call each industrial on the list. If possible he tried to get the superintendent or the man in charge of electrical repairing on the other end of the wire and gave his sales talk to the right person. This was considered a very important point in this campaign, as there was usually just one person who had the authority to purchase electrical repairing and new motors, and time spent trying to sell anyone else was wasted.

The letter shown was mailed to each of the 1,800 prospects on the list the day after he was called on the telephone. In the cases where the name of the right buyer was obtained the letter was of course addressed directly to him. The salesman, after calling the entire list on the telephone, started making personal calls on the same list, giving special attention to those who answered the first form letter. He took along the index cards containing the list of industrials and noted down the details of his personal visit with the superintendent or manager. Stickers had been attached to the letters as they were mailed out, and the salesman carried along a supply of stickers on his calls which he left with the superintendent as a reminder, and, where possible, stuck on the walls of shipping rooms.

T. W. Findley, general manager of the company, states that the salesman was able to write sufficient lamp contracts to cover the expense of his personal canvass, and the telephone solicitation yielded sufficient immediate business to pay the expense in that portion of the work. The campaign, he says, was very effective, inasmuch as it produced a number of new accounts which will doubtless continue until they are old accounts.

## Co-operation Among Inspectors

J. C. Forsyth, president, Eastern Association of Electrical Inspectors, favors greater cooperation among electrical inspectors throughout the country, believing that "the conflicting rules are largely due to a lack of facility for united thought on the part of the inspection departments."

"Why should there be such a difference in requirements as we find in many of our cities today?" Mr. Forsyth asks. "Why should there be more stringent rules applied to electrical construction work in one building than in another of the same type and occupancy, a few yards distant, because an imaginary line happens to be drawn between them denoting a fire or building zone? Let us have done with special rules which can neither be defended by reason or logic, base our requirements on adequate safety alone, and allow the owner or his representative full liberty to choose that type of electrical construction and equipment that best suits his aesthetic tastes and his pocketbook. Let us have standards based on performance both in the laboratory and in the field, and when any method or system or material or device or apparatus has demonstrated its ability to fulfill the requirement let it be accepted and approved, even if there may be occasionally a reduction in the cost to the public.

"The conflicting and varying rules throughout the country today are largely due to a lack of facility for united thought on the part of inspectors."

# Electrical Industry Wants Better Fusing

## Survey Just Completed Indicates All Branches Believe Present Method of Fusing is Unsatisfactory

By F. N. M. SQUIRES,
Assistant Chief Inspector, New York Board of Fire Underwriters

FROM a study of 189 answers to a questionnaire on aspects of the present situation with regard to fusing, it appears that 166 (87 percent) representative contractors, inspectors, engineers, and central station executives, believe some improved fusing system should be adopted. The survey covers all sections of the United States and Canada, and the answers show conclusively that members of the electrical industry are convinced that the present method of fusing is unsatisfactory, unsafe and should be superseded. A tabulation of the questions and answers is shown.

Following are comments on the questionnaire from contractors, city electricians, municipal inspectors, superintendents of lighting and trouble departments of central stations, fire department inspectors, electrical engineers, underwriters inspectors and foremen:

"Overfusing is general in the commercial territory."

"Second offenders are taken to police court, and the insurance rating bureau is notified. Usually a letter from them threatening a raise in rates does the work."

"The master mechanic conceived the idea of putting in short pieces of brass tubing of the same diameter as the fuse, dispensing with fuses and claimed that fuse expense and interruptions had been eliminated."

"On a reinspection: one of the fire inspectors was with me and he saved the pennies that we found behind fuse plugs and had a double handful when we finished this inspection. In this inspection there were only six business houses in the entire district for which I did not give an order to repair or replace wiring."

"On the subject of your letter I am holding up both hands in favor of a plug cutout so designed that it would be impossible to overfuse the branch circuits. In one bridged circuit the insulation dropped off and caused fire of some thousands of dollars."

"Improper fusing; this includes too large capacity, refilled cartridge fuses, hair pins, tin foil, solder, busbar copper, nails, horseshoe, jumping cutout, solid and stranded wire, pennies and plug fuses filled with lead."

"I believe, of course, in proper fusing, but cannot seem to believe it will be brought about by a change of this kind."

"Fixtures and cords have burned by failure of oversized fuses to blow."

### Survey on Fusing

**Do you have difficulty with overfusing of branch circuits?**
164 Yes
8 No
15 Some, occasionally, etc.

**Have you encountered bridging of branch circuits?**
172 Yes
10 No
9 Some, occasionally, etc.

**If answer to either or both of above is yes, can you give an idea whether this condition is in general use throughout your territory?**
118 Yes
28 No
30 Some, occasionally, etc.

**Is this abuse found in residential property?**
161 Yes
5 No
15 Some, occasionally, etc.

**Is this abuse found in commercial risks?**
154 Yes
8 No
20 Some, occasionally, etc.

**Do you know of any damage traceable to abuse of plug fuses?**
77 Yes — 9 Meters burned
36 No — 4 Deaths
26 Fires — 41 Blank

**Do you consider that a new standard branch circuit fuse and cutout, that cannot be readily bridged or overfused should be adopted?**
147 Yes
17 Yes underlined, bet your life, by all means, at once, etc.
5 Question, would consider, knowing more details.
1 Believe all ideas should be accepted if passing tests which are used on present types, and not make just one new standard.
1 Favors circuit breaker protection.
16 Blank
2 No.

"Located, because of trouble; 127 pennies, thirty-four cutouts jumped, nineteen cut fuses, thirty-five causing fires, twelve meters burned, three houses burned up, several with insulation burned off. These items during the last four years."

"Small fires and motors ruined."

"A division is necessary on fuses and cutouts to 15 amp. and 16 to 30 amp. If they can be furnished so that gap cannot be overfused, bridged or plug used, so much the better and same would meet with my hearty approval."

"It seems impossible to educate the general public in the matter of proper fuse protection, as a result overfusing and bridging in either mains or branches have become potential fire hazards. Any device that will eliminate this hazard would certainly be a benefit to the entire industry."

"There seems to be a general practice for washing machine salesmen to install 30 amp. fuses in branches and mains when they make demonstrations and sales."

"In this connection will say that the bridging and plugging of fuses is so generally practiced in this territory, and we presume the same condition prevails throughout the country where electricity is used, that we are of the opinion the answering of this questionnaire would not really be of any new information to you. We believe that one of the solutions of this problem is the cutout base."

"House wiring and meter burned up. Cause: bridging with pennies behind blown fuses."

"Bridging of fuses is found in such cases where a larger size of fuse cannot be accommodated in the receptacle. The cutout limits the size of fuse and when these fuses blow repeatedly they are usually bridged."

"I believe, however, that overfusing is a condition which should be considered by the Electrical Committee of the National Fire Protection Association, and I consider that the adoption of a rule requiring some better method of preventing this practice would be worthy of consideration."

"I consider the failure to meet the issue of bridged fuses as a serious reflection on the industry interests."

"I have a box full of pennies, washers, tinfoil, soldered fuses, etc., that have been taken out at various times and also coins that have been taken out of branch circuits and mains where they have been instrumental in calling out the fire department."

"Some years ago we made a house to house canvass. We replaced several thousand fuses, but it was not all due to plugged fuses. Improper fuses were the greatest cause."

"Many fires and accidents in my belief are caused by overfusing. With all the junk appliances and devices that are on the market today what a blessing it would be if we had the proper safety valve."

"If some device is manufactured that will give proper protection and yet is so made that it will be impracticable to bridge or overfuse the cutout in any manner then the problem will be practically solved so that inspection will be greatly benefited and fire hazards reduced to a minimum."

"Where wiring is installed without inspection 660 watt receptacles are often used in place of plug fuse cutouts."

# Estimating Methods---VIII

## Examples
## Branch Circuit Labor Data
## Problems
## Classes of Construction
## Labor Calculations
## Extensions

By ARTHUR L. ABBOTT
Technical Director, Association of Electragists, International

THE proposal to make use of a job factor in every estimate has probably caused more discussion than any other feature of the Association of Electragists, International, estimating system. The reasons for adopting this apparently new idea were stated last month, and it was also explained that the idea is not actually new; it is common practice to adjust the labor to the characteristics of the job; it is merely proposed that a systematic method of making this adjustment be employed. A few examples may help the reader to understand more clearly how the job factor is computed and used.

1. Each floor of an 8-story fireproof office building is 60 ft. by 120 ft., and the general contractor is neither very good nor very poor (from the electrical contractor's viewpoint).

The area of one floor is 7,200 sq. ft. Being a fireproof building, the conduit work to be built into the floor and walls, the number of stories is of no importance. For the given area of 7,200 sq. ft. per floor the size factor is found from the table to be about 15 percent. For an office building the layout factor is 4 percent. The general contractor being of just medium efficiency, a factor of 8 percent may be assigned to him.

| | |
|---|---|
| Size factor | 15% |
| Layout factor | 4% |
| General contractor | 8% |
| Job factor (total) | 27% |

The labor as estimated by using the data in Table 7 is 1,150 hours for all the branch conduit work. To this is to be added 27 percent of 1,150 or 311 hours, making a total of 1,461 hours, which is the figure to be used in the estimate.

2. A fireproof school building has an area per floor of 150 ft. by 200 ft. The general contractor is unknown.

The area per floor is 30,000 sq. ft. and the corresponding size factor is 3.5 percent. The typical layout of a school building calls for a factor of 5 percent. Not knowing who the general contractor may be a conservative allowance here is 10 percent.

| | |
|---|---|
| Size factor | 3.5% |
| Layout factor | 5.0% |
| General contractor | 10.0% |
| Job factor | 18.5% |

This percentage is then to be added to the labor computed from the tabulated data, as was done in Example 1.

3. A warehouse is built of reinforced concrete and is 100 ft. wide by 400 ft. long. The builder always works fast and is a good cooperator.

The area per floor is 40,000 sq. ft. for which the table gives a size factor of 1.5 percent. A typical warehouse job is the maximum of simplicity and no percentage need be added as a layout factor. Two or 3 percent is a fair addition to make for this builder; 2.5 percent may be used to make the total an even figure.

| | |
|---|---|
| Size factor | 1.5% |
| Layout factor | — |
| General contractor | 2.5% |
| Job factor | 4% |

4. A suburban store building is to have only one story and a basement. The dimensions are 30 ft. by 60 ft.; the outside walls are brick and the interior is wood frame construction. The builder is efficient and a good man to get along with.

The area of one floor is 1,800 sq. ft., but this being a building having wood joist floors to find the size factor the combined area of the two floors, or 3,600 sq. ft., must be taken, giving 19 percent. A small store building takes a layout factor of 3 percent; this one is very small and the layout is quite simple, so that 2 percent is sufficient. Following the usual rule the allowance for the general contractor would be about 3 percent.

| | |
|---|---|
| Size factor | 19% |
| Layout factor | 2% |
| General contractor | 3% |
| Job factor | 24% |

Now the labor for roughing-in the branch circuit work on this job figures as per the table 52 hours, or a little over three days for two men. A 24 percent addition would be 12.5 hours. This is intended to cover the loss of time which occurs on every job when the work is started and when it is finished, time for getting familiar with the layout, checking conduit runs and getting exact locations of special outlets, and delays caused by the builder. But this job is so small that the estimator can easily visualize the entire operation and it therefore calls for the application of common sense rather than any fixed rule in determining the proper time allowance for all the items mentioned above. It is well to calculate the job factor by using the rule, and then to consider whether the time so found is reasonable under the known conditions, and to make such an addition as seems proper, perhaps more or perhaps less than the time calculated.

It is possible that the contractor may find that the total actual labor on the branch circuit work is often quite close to the labor computed without taking the job factor into account. This does not indicate that the job factor method is wrong or that it should be neglected altogether, but it rather indicates that conditions of unusually high efficiency are being maintained. In this case the contractor should first make sure that the low labor costs are due to the high efficiency of his workmen and his methods of job management, and not due to some peculiar and unusual conditions on a few jobs. If it is clear that an efficiency of say 10 percent better than the average is being maintained on the branch circuit work on all jobs then this percentage should be deducted and after that the job factor percentage should be added; otherwise the feature of adjusting the labor to fit the job will

be lost. It will be found that in common practice the job factor will range from 5 percent to 30 percent, that is, the cost of labor per unit of work done will vary about 25 percent. To neglect the job factor is to put all jobs on a dead level and lose all means of differentiating between installations of different characteristics.

A case illustrating the point just brought out is that of a large office building recently completed in which there were a total of 4,974 outlets. An approximate record of the labor on the branch conduit work showed a total of 7,240 hours. The labor computed by using the units in Table 7 is 7,730 hours; the job factor would be 5 percent and the total estimated labor would be 8,117 hours. Assuming that the labor record is correct, the actual time is 89 percent of the estimated time. If this performance can be duplicated on several jobs 11 percent might safely be deducted in future estimates, but the job factor should still be applied.

### Branch Circuit Labor Data

Any experienced estimator who will take the time to figure the branch circuit conduit and outlet box labor for some actual installation according to the method explained here, also according to his own method, will probably find that the net results agree quite closely, provided that the job has no characteristics which render it unusual or out of the ordinary. It may be asked what advantage then has the A. E. I. method if the results are practically the same using a somewhat more simple method?

In answer to this question it is first necessary to consider the fact that any record of the actual labor on branch conduit work must be a lump sum total of the time spent on conduit and boxes; without very great expense it is impossible to keep any record of the exact time chargeable to the conduit and the exact time chargeable to the boxes. The division of the total time between these items must, therefore, be made on some more or less arbitrary basis.

In producing the commonly used estimating units this split-up has been made on some basis which seemed reasonable to the estimator and, of course, on a basis which checked out accurately with records of the total labor. The data so produced may be incorrect, but will still give fairly accurate results on any installation which is of the same general type as the installation on which the time record was obtained. But when a job is found which is radically different the estimated labor may be seriously in error.

In the office building installation previously mentioned in the discussion of job factors the total labor on the branch conduit work was estimated by the A. E. I. system as 8,117 hours, and the labor was recorded as 7,240 hours. There is good reason to believe that the difference may be accounted for by unusually high efficiency of the working force, so the record may be considered as fairly good evidence of the accuracy of the A. E. I. figures. One estimator who figured the job used the following labor units:

½ in. conduit..... 5.73 hr. per 100 ft.
¾ in. conduit..... 6.13 hr. per 100 ft.
Ceiling outlet boxes. 35.2 hr. per 100 ft.
Wall outlet boxes. . 54.3 hr. per 100 ft.

His total estimated labor on this division of the work was 10,600 hours.

### Close Estimating

The difficulty here is that the split-up between pipe and boxes is wrong; far too much labor is figured on the pipe and not enough on the boxes. This is a common error. The unusual feature of this job was the quantity of conduit per outlet—about 25 ft., 15 ft. to 20 ft. per outlet being more common. If the conduit quantities are reduced so that there is only 18 ft. per outlet, all other items remaining the same, the estimated labor using the above units would be 7,490 hours and the A. E. I. data would give 7,456 hours, and these figures would undoubtedly prove to be very nearly correct under ordinary conditions.

As another example illustrating the same point, on a certain installation the total labor on branch conduit work was actually 3,075 hours and the labor estimated by the A. E. I. system was 3,099 hours. In this case there were 27 ft. of branch circuit conduit per outlet. The following labor data used by one estimator were tried out by applying to the actual quantities on this job:

½ in. conduit..... 4.0 hr. per 100 ft.
¾ in. conduit..... 4.8 hr. per 100 ft.
1 in. conduit..... 6.4 hr. per 100 ft.
Ceiling outlet boxes. 24.0 hr. per 100 ft.
Wall outlet boxes... 40.0 hr. per 100 ft.

The total estimated time computed with these units would be 3,843 hours or 25 percent too high. If we again reduce the quantities of conduit to 18 ft., per outlet, the above units would give a total of 2,789 hours and the A. E. I. data a total of 2,751 hours, the two methods being substantially in agreement.

### Indirect vs. Direct

A method used by one estimator whose ability is unquestioned is to apply labor units to the conduit alone, neglecting the outlet boxes altogether in

PRICING SHEET

ESTIMATE NO. _____

Job Example 1 – Industrial Plant — SHEET NO. _____

Work Lighting Branch Circuit Conduit and Boxes — OF _____ SHEETS

ESTIMATED BY _____ PRICED BY _____ EXTENDED BY _____ CHECKED BY _____ DATE _____

| Material | Quantity | Material List Price | Per | Disc. | Extension | Labor Unit Pr. Hours | Per | Extension Hours |
|---|---|---|---|---|---|---|---|---|
| Conduit – ½" | 6700' | | | | | 1 20 | C' | 80 40 |
| ¾" | 1350' | | | | | 1 50 | C' | 18 75 |
| 1" | 200' | | | | | 2 10 | C' | 4 20 |
| Ceiling Outlet Boxes | 315 | | | | | 15 50 | C | 48 80 |
| Ceiling Pipe Entrances – ½" | 532 | | | | | 18 | C | 95 |
| ¾" | 40 | | | | | 21 | C | 8 40 |
| 1" | 12 | | | | | 36 | C | 4 32 |
| Wall Outlet Boxes | 21 | | | | | 36 | C | 7 56 |
| Wall Pipe Entrances – ½" | 50 | | | | | 63 | C | 31 50 |
| ¾" | 30 | | | | | 73 | C | 21 90 |
| 1" | 8 | | | | | 98 | C | 7 84 |
| | | | | | | | | 3 29 67 |
| | | | | Job Factor – | 12% | | | 39 60 |
| Floor area 150' x 170' = | 25500 sq.ft. | | | | Estimated Time | | | 3 69 27 |
| Area Factor 5% | | | | | | | | |
| Layout Factor 1% | | | | | | | | |
| General Contractor 6% | | | | | | | | |
| Job Factor 12% | | | | | | | | |

**Example 1—Industrial Plant**

PRICING SHEET

ESTIMATE NO. _____

JOB Example 3 - One-Story Garage SHEET NO. _____

WORK Exposed Work for Lighting Circuits OF _____ SHEETS

ESTIMATED BY PRICED BY EXTENDED BY CHECKED BY DATE

| MATERIAL | QUANTITY | MATERIAL LIST PRICE | PER | DISC. | EXTENSION | LABOR UNIT PR. HOURS | PER | EXTENSION HOURS |
|---|---|---|---|---|---|---|---|---|
| Conduit - ½" | 425' | | | | | 2 80 | 0' | 11 90 |
| ¾" | 33' | | | | | 3 30 | 0' | 1 09 |
| 1" | 33' | | | | | 5 70 | 0' | 1 88 |
| Ceiling Outlet Boxes | 30 | | | | | 72 | C | 21 60 |
| #FS1 Condulet | 1 | | | | | 72 | C | 72 |
| | | | | | | | | 37 19 |

**Example 3—Small Garage**

estimating the labor. Detailed labor records are kept on nearly all jobs, and a record is made in each case of the feet of conduit per outlet. This data is consulted when an estimate is being made and a unit time or cost per 100 ft. of pipe is determined from jobs having about the same ratio between feet of pipe and outlets as the job being figured. This method accomplishes the desired result and apparently has the merit of extreme simplicity. It would seem, however, to be a round-about, indirect method, and it is doubtful whether it is after all as simple as the direct method of figuring labor on each of the items which are responsible for the labor.

It frequently happens that two or more classes of building construction are employed in one building. In such a case, if the greater part of the building is of one class and only a small amount of the branch conduit work is to be installed in locations where the odd construction occurs, it is better to figure all work as to be installed in the prevailing type of construction. On the other hand, if there is a considerable amount of branch conduit work in each of several classes of construction, the quantities to be installed in each class should be kept separate in the take-off and should be listed separately on the pricing sheets. Thus, in a large hotel, the first six stories had suspended ceilings, and in the remainder of the building the conduit work was built into concrete floor slabs. It was a simple matter to make two totals of branch circuit quantities and figure each section separately. Again, a two-story store building having wood frame interior construction may have exposed work in the basement, Class D-3 for the 1st floor ceiling, and Class D-4 for the 2nd floor ceiling. The best method here is to segregate the work on each floor and apply to each division the corresponding labor units.

### Classes of Buildings

Class E in Table 7 is exposed work on any type of building material, and as noted the labor data given here does not include any allowance for installing the fastenings or supports. It is evident that the only difference between installing a given piece of work on wood and installing the same work on hard concrete is the difference in attaching the conduit and boxes to the two kinds of material. The labor on the fastenings can be computed from the data in Table 2 in the October, 1927, installment.

By including the labor on fastenings with the conduit and outlet box labor this need not be made a separate item in the estimate. Also, it will be noted that for exposed work there is only a slight difference in the pipe entrance labor between ½ in. and ¾ in. and between entrance to ceiling outlets and to wall outlets. In any ordinary layout there are always exactly two pipe entrances per outlet (this is the average for all outlets connected to one "home run"). It is, therefore, possible to closely approximate the pipe entrance labor per outlet on exposed work when the branch conduit is all ½ in. and ¾ in., and by adding to the 1 in. conduit labor an allowance to cover the additional pipe entrance labor for this size, this item also can be absorbed. For classes E-1 to E-5, inclusive, labor units have been worked out applying to conduit and boxes which include all labor on fastenings and pipe entrances, so that these items do not need to be figured separately.

Example 1 on page 36 is a pricing sheet showing the labor estimate for the branch circuit conduit and outlet boxes in an industrial plant. The building is Class A construction, that is, reinforced

PRICING SHEET

ESTIMATE NO. _____

JOB Example 2 - Large Hotel SHEET NO. _____

WORK Lighting Branch Circuits and Low Tension Conduit OF _____ SHEETS

ESTIMATED BY PRICED BY EXTENDED BY CHECKED BY DATE

| MATERIAL | QUANTITY | MATERIAL LIST PRICE | PER | DISC. | EXTENSION | LABOR UNIT PR. HOURS | PER | EXTENSION HOURS |
|---|---|---|---|---|---|---|---|---|
| Conduit - ½" | 51030' | | | | | 1 30 | 0' | 813 |
| ¾" | 1680' | | | | | 1 50 | 0' | 35 30 |
| 1" | 230' | | | | | 2 10 | 0' | 4 83 |
| Ceiling Outlet Boxes | 972 | | | | | 1 750 | C | 170 |
| Ceiling Pipe Entrances - ½" | 1944 | | | | | 2 7 | C | 525 |
| Wall Outlet Boxes - | | | | | | | | |
| Bracket | 420 | | | | | 3 6 | C | 151 20 |
| Switch | 1030 | | | | | 3 6 | C | 367 50 |
| Receptacle | 812 | | | | | 3 6 | C | 293 |
| Telephone | 318 | | | | | 3 6 | C | 114 50 |
| Fire Alarm & Bells | 50 | | | | | 3 6 | C | 18 |
| Wall Pipe Entrances - ½" | 4570 | | | | | 6 3 | C | 2 880 |
| ¾" | 345 | | | | | 7 3 | C | 252 |
| 1 | 12 | | | | | 9 8 | C | 1175 |
| | | | | | | | | 5 423 98 |
| | | | | | Job Factor - 16% | | | 867 |
| Area per floor - 14800 sq.ft. | | | | | Estimated Time | | | 6 290 98 |
| Area factor 9% | | | | | | | | |
| Layout factor 5% | | | | | | | | |
| General contracot 1% | | | | | | | | |
| Job Factor 16% | | | | | | | | |

**Example 2—Large Hotel**

concrete throughout. The conduit work was built into the floor slabs and so-called "concrete" boxes were used of sufficient depth to eliminate offsets in the conduit. A record was kept of the labor on this part of the installation which shows 358 hours actual time. This is 97 percent of the estimated time.

#### Examples of Labor Calculations

Example 2 is a much larger job in which the floor construction was Class B, that is, the common type of construction having a steel frame and floors built by setting tile in rows on the wood forms and filling in with concrete between and over the tile. The preliminary figure for the labor is 5,420 hours. The job factor is computed as 16 percent, and adding this percentage the estimated labor is 6,287 hours. The actual labor on this work was 5,637 hours or 90 percent of the estimated time. This may seem to be an indication that the labor units used are too high, but on the contrary the results shown by the records on this job are considered as very good evidence that the labor data is very nearly correct. The contractor who did this work makes it a regular practice to apply a job cost control system, which fact is a sufficient explanation of the saving in labor. A saving of at least 10 percent in labor costs is to be expected when such a system is employed.

It will be noted that in Example 2, if the job factor had been neglected, the estimate would have been more nearly correct than it is with the 16 percent added. It would be a mistake, however, to conclude that better results can be obtained by neglecting the job factor. What the record really shows is that this organization was on this job working at about 10 percent better than average efficiency. If the records on several other jobs show about the same result this contractor is justified in deducting 10 percent from the estimated labor, but the addition for the job factor should always be included.

Example 3 shows the use of the units in Table 7 applying to exposed work on wood. In this case the estimate is very simple because it was possible to combine the pipe entrance labor with the outlet box labor and because the labor on pipe straps and wood screws is included in the pipe and box units. The actual labor on this work was 36¼ hours or 98 percent of the time estimated. The amount of work to be done being so small it is better not to apply any job factor, but some allowance should be made in the complete estimate for non-productive labor.

Care should be taken to enter the labor units in the manner shown on these forms, also to indicate whether the unit time is per 100, per 1,000 or each. For estimators who are accustomed to using labor units in the form of dollars and cents instead of hours it is suggested that a unit such as 36 hours per 100 should be set down on the sheet in exactly the same way as if it were $36; a unit such as 1.5 hours per 100 is entered the same as if it were $1.50, and in this case it is better to add the "0" after the 5 to avoid mistakes. The use of the columns on the form provided for material, prices and extensions should be quite evident without any explanation.

The right way to make the extensions on the pricing sheets is to have this work done by a comptometer operator. Saving the estimator's time in this way is one of the many economies that can be effected in a large organization. If the estimator must make his own extensions and is not provided with some kind of a calculating machine he should by all means use a slide rule for this purpose. It is sometimes said that a slide rule is not sufficiently accurate for so important an operation as figuring money values, but the following example shows what the facts are.

#### Use of Slide Rule

Suppose that the quantity of ½ in. conduit is 2,470 feet and the cost of this material is $5.47 per 100 feet. By a rapid calculation with the slide rule the total cost or extension is $135. An exact calculation gives $135.11. Now, the amount of eleven cents is of no importance as compared to $140. Eleven cents is approximately the value of two feet of conduit, and no estimator would make any pretense of being able to figure the cost of labor on 2,470 feet of conduit within $1 of the actual amount, to say nothing of being accurate to the last dime. If the quantity of conduit is multiplied by 100 the slide rule would give a cost of $14,000 and the error would be $10.90; the same reasoning applies in this case.

All extensions on the three pricing sheets shown here were made with a slide rule.

All extensions should be checked, no matter how they are made or by whom they are made. It is especially important to have no confidence in anyone's ability to put the decimal point in the right place. A simple mental calculation will show whether an extension should be $3.65, $36.50 or $365.00, and this check should invariably be made.

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## A Collection System That Collects

The small contractor can do merchandising with profit on the charge account system if he has a successful collection program. That is the experience of Morrison & Turbett, Inc., of South Orange, N. J., who do more than 80 percent of their business on a charge basis. With about 2,500 open charge accounts on the books their only losses have been one eleven dollar account and a few two dollar accounts in the past five years. Resort to the law to collect has been necessary only twice.

An efficient collection system is responsible for the small loss, Mr. Morrison feels. Most of the charge customers pay as soon as they receive the first bill. Statements are sent monthly for three months before the account is considered dangerous and then intensive collection efforts begin. Three personal letters are written to all accounts when three months overdue, appealing to the sense of fair play of the customer. One of the series follows:

"Dear Madam—Our bills are sent regularly because, no matter how much we like to extend credit to the 2,500 people on our books, it is impossible to do so for more than a limited time. A credit of only $7 to each one would mean $15,500 for us to carry, so it should be plain that all accounts, whether large or small, be met promptly and in a spirit of fair play. All open accounts are now due. This is a business proposition with us and we hope it will be taken in just that way by you."

If payment is not received in a few days after the third letter has been sent out the account is turned over to Mr. Morrison, who takes a memo home and puts it near his telephone. Every time he goes near the phone he calls the delinquent customer, day or night. Often as late as midnight Mr. Morrison calls the customer to remind him the check has not arrived. The continual pestering nearly always brings in the payment.

## Co-operation Sells

# $15,000

# Wiring, Fixtures and Appliances

RESULTS of the cooperative advertising and selling campaign carried on in November, 1927, by the Denver Electrical League indicate that $15,000 worth of convenience outlet installations, fixtures and appliances were sold at a sales cost of 16 percent, or $2,466.82.

Indirect results of the campaign would undoubtedly bring up the total sales considerably, but it was impossible to obtain more complete data. Actual figures show that twenty-four out of the seventy-three Denver electrical contractors in the campaign installed 672 duplex convenience outlets; 254 miscellaneous outlets, including brackets, ceiling and switches; sold 721 boxes and plates; sold 163 fixtures to wiring customers, and $2,628 worth of appliances.

On the theory that practically everyone is a prospect for an additional convenience outlet in his home, and that the purchaser of a new one frequently overlooks the all important feature of adequate wiring, the Colorado league set about to create additional wiring business in the dull month of November. Advertisements appeared in each of the four local papers every day except Saturdays and Sundays. Each advertisement was laid out similar to the one shown, included the names of all contractor members of the league and featured a special price of $15.85 for the installation of three duplex convenience outlets during the 30 day period.

The price was suggested after conferences with contractors and careful estimates of the cost of installing duplex outlets in a typical situation. A price was desired which would be low enough to be fair and appealing to the public.

Special Convenience Outlet Order No 187

Date ..... 192...

CUSTOMER'S NAME .....

ADDRESS .....

PHONE ..... WHEN WANTED .....

Installation of 3 Duplex Convenience Outlets, (or ..... Duplex Convenience Outlets and ..... Single Pole Switches), at special introductory price ..... $15.85

Installation of ..... additional outlets (..... C. O's. and ..... Switches), at special price of $4.95 each .....

Remarks:

Total ..... $

Work authorized by .....

(THIS COPY TO BE HELD BY CONTRACTOR UNTIL CALLED FOR)
(TISSUE COPY IS TO REMAIN THE PROPERTY OF CONTRACTOR)

ELECTRICAL CONTRACTOR .....

ADDRESS ..... PHONE .....

**Special Order Blank Used in Convenience Outlet Campaign**


**One of the Eight Advertisements Which Ran Daily in Denver Newspapers**

Order books were prepared by the league and placed in the hands of all the contractors. This made it easier for the staff of the league to compile the results of the campaign.

Copies of the Copper and Brass Research Association's booklet, "Wiring and Rewiring," were distributed among the contractors and the advertisements suggested that customers request copies from their regular contractors.

Commenting on the results obtained from the campaign, E. C. Headrick, secretary of the Denver Electrical Contractors' Association, said: "The campaign, in our candid opinion, has been a success and of great help to the electrical industry and an educational benefit to the public. At the conclusion of this campaign we are prompted to declare ourselves much in favor of encouraging future campaigns in a like manner."

George Bakewell, manager of the Electrical League of Colorado, stated that: "From the standpoint of improved trade relations the convenience outlet campaign is looked upon favorably by local central station officials. The Public Service Company did not solicit any of the wiring business. Jobbers in Denver report a very satisfactory increased business in wiring materials. Local contractors are still reporting an increased demand for additional outlets in residences, and league officials feel justified in estimating that, on an investment of $2,446.82, the electrical industry did a gross volume of business closely approximating $15,000 during the period of the campaign."

# Chats on the National Electrical Code

*A Monthly Discussion of Wiring Practice and Questions of Interpretation, Presented with a View Toward Encouraging a Better Understanding of the Industry's Most Important Set of Rules*

**Conducted by F. N. M. SQUIRES**
**Assistant Chief Inspector, N. Y. Board of Fire Underwriters**

### Switches for Electric Ranges

Objection was recently made to the installation of an electric range with no master switch at the range. The single pole switches for the individual units were provided but the switch controlling the entire range was located three floors below.

If a pan of grease were boiling over and blazing the individual switches could not be reached, and as the range was not consuming an excess of current, the fuses or circuit breaker protecting the circuit would not open. Valuable time then would be lost in reaching the master switch located in another part of the building.

The 1923 Code (1602 d) was very specific in that each complete heating appliance of more than 1200 watts total capacity had to be controlled by an indicating switch located *within sight of the appliance* and readily accessible. The 1925 Code (1602 e) boldly leaves out the above italicized words.

In reading the rule the impression seems to be that the meaning is implied that this switch shall be readily accessible "to the location of the appliance." However, the Code does not say this and the inspection departments cannot insist that this switch be located at the appliance as long as there is one somewhere on the circuit.

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### Trip Coil Protection

The question of complete trip coiling of circuit breakers used on multiphase alternating current systems whether under 600 volts or over 600 volts has been a most puzzling one. Those who have studied the problem seem to be pretty well agreed that the actuating device may be safely omitted from one live wire of a multiphase circuit in the case of motor protective devices which are primarily intended to protect the internal circuits of the motor. The desirability of complete trip coiling of circuit protective devices has never been questioned but the *actual necessity* of such complete trip coiling has long been doubted due to the fact that very few cases of trouble have arisen because of the omission of an actuating device in one live wire of a multiphase circuit.

The Code permits the omission of an actuating device in one live wire of ungrounded multiphase systems and also in the grounded lead of multiphase systems having one leg (not neutral point) grounded. The practice relative to grounding, however, varies in different sections of the country so that a circuit breaker which might be approved in one location would be condemned in another were the inspector to request strict compliance with the Code. Inspectors, however, have usually waived the requirement for complete trip coiling called for in the Code on certain multiphase systems simply because manufacturers have failed to provide the necessary equipment.

On extensive net works there are so many chances for accidental grounds that in practise we can seldom rely on having a permanently ungrounded multiphase system and for this reason an inspector would be fully justified in asking for complete trip coiling even on normally ungrounded systems. However, as mentioned above, very few cases of trouble have developed because of incomplete trip coiling and on this point I have the following comments to offer:

FIRST: Considering the case of circuits over 600 volts, the conductors of such circuits inside of buildings are usually all contained under the same metal sheath (multiple conductor metal sheathed cable required by Code). Should trouble develop on the unprotected conductor of the circuit, it would quickly involve adjacent conductors of the same circuit and cause the relays in the latter to function.

SECOND: Considering the case of circuits under 600 volts, the same (though possibly somewhat delayed) action would take place as stated for circuits over 600 volts where the conductors of the low potential circuit are installed in metal conduit or metal enclosures. The very fact that actuating devices are omitted from one live wire to certain circuits of certain systems is a strong argument for requiring the conductors of such systems to be installed in metal conduit.

THIRD: A ground on the unprotected wire of a multiphase system indirectly increases the load in the ungrounded phase due to phase converter action of motors on the system. The motors tend to compensate for unbalanced voltage at their terminals by drawing current from the ungrounded (normal voltage) phase and feeding back into the grounded (low voltage) phase. Such phase converter action may be sufficient to trip the actuating device in the other conductors of the circuit.

Presumably rules and regulations involving extensive changes in design of standard equipment are justifiable only when such standard equipment fails to provide the required degree of protection to be reasonably expected. It would appear from past experience that the hazard from incomplete trip coiling on multiphase circuits is more imaginary than real.

—L. W. GOING.

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### Wires in Attics and Concealed Roof Spaces

The Code says that "wires may be run on the top edge of joists in inaccessible roof spaces." Inaccessible means inaccessible, and any roof space that is accessible in whole or in part, will need the joists to be bored.

Contractors should not take a chance and knob on top of joists where there is any likelihood of the builder putting a trap door in the ceiling or a movable

shutter in the gable. The rule in the Code that permits knobs on top of joists was made to facilitate the wiring in concealed spaces under flat roofs where there is not more than 2 feet head room in the concealed space.

Another thing to remember is that where there is a stairway or ladder leading to the attic, the wires between or through the joist should be covered with flooring or other boards securely nailed in place, so as to protect the wires from mechanical injury.

—George Welman.

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**Portable Lamps**

The Underwriters' Laboratories, Inc., are listing portable lamps as approved and some stand should be taken by inspection departments if we are ever going to see portable lamps of safe design placed on the market.

The manufacturers of many of the fancy stand lamps show by their actions that they are not interested in fire prevention. Their fancy lamps are sometimes wired even worse than a twelve year old school boy wires his lamp in the manual training department of the grammar grades. Manufacturers of dangerous electrical apparatus are the "boll weevils" in the electrical industry and should be controlled or put entirely out of business. The flexible cord on a large percentage of these lamps is so poorly made, that its sale should be prohibited.

These poorly made lamps with fancy shades sell for as much as the substantially made standard lamps, and it is no saving to the users of the lamps to purchase the cheaply wired types. The market for these dangerous lamps is based solely on ignorance of the buyers and users, buttressed by the usual American policy of indifference to the fire hazard involved.

—George Welman.

---

**Cabinets and Something Better**

A sheet metal cabinet to enclose fuses and switches answers the purpose in so far as a covering to prevent accidental contact is concerned. It also prevents hot metal falling on ignitable material and starting a fire, and might do some good in the case of fuses exploding or arcing when a short circuit occurs. As an enclosure for general purposes in relatively clean places, sheet metal cabinets serve their intended purpose, but in dusty, linty or gaseous places they are unsatisfactory; in the latter places, cabinets should be practically air tight and provided with gasket and threaded entrance holes. They might also be provided with wing nuts on the doors to hold them fast against the gasket. A sheet metal cabinet made of sheets of standard thickness is not rigid enough to fulfill the requirements for cabinets in dusty or linty places. Several manufacturers make cast-iron cabinets that are suitable for hazardous locations.

These cabinets cost more money than the sheet metal type, but they are proportionately better. It would be encouraging to see a greater number of cast-iron cabinets in service. They are necessary to protect fuses and switches in dusty or linty places.

—George Welman.

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**Small Circuit Breakers**

The Code at present prohibits the approval of other fuses in the 0-30 amp. sizes than the plug types. It has been proved that these fuses do not give the proper protection and that a more effective "safety valve" should be required.

What shall it be? If the Code refuses to recognize a fuse which will give the desired protection, we must turn to something else.

The Code does recognize the use of circuit breakers in place of fuses and if we cannot get adequate protection from fuses we will have to try the circuit breakers, but the breakers must not be allowed to fall into the same abuses that the fuses have.

Circuit breakers of the 0-15. amp. size, therefore must be made unalterable. This is perfectly possible and feasible. It is a very simple matter to so guard the vital or actuating parts that tampering with it, while not being exactly impossible, will be difficult.

Consider, then, the advantage to be obtained from the use of such a device. When a fuse blows, that plug is worthless for further use (at least it is supposed to be) and we must buy a new one and insert it. If there is still trouble on the circuit, several fuse plugs may be wasted before it is cleared.

When the trouble occurs on a circuit protected by a circuit breaker, a simple twist of the wrist resets it. If a short is still on the breaker trips right out again but there is no expensive waste. How much easier it is, therefore, to maintain circuits when they are so protected. But the breaker must be made foolproof first.

When all of the advantages of these small circuit breakers are realized they will probably supersede fuses entirely in a great many instances.

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**An Abuse of Approved Material**

There is one class of construction that we would like to mention, mainly because we were in favor of it when it was proposed; and that is non-metallic sheathed cable.

In a community nearby we found nails driven through cable as supports with no junction or outlet boxes at the terminals. Our recommendation to those who are interested in retaining this form of electrical construction is to do some missionary work in the field through the jobbers or otherwise. It will only take a few electrical fires from this class of material to put it in a bad light. The non-metallic cable is, no doubt, as safe as other forms of construction, when properly installed.

—George Welman.

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**Interpretation No. 9**

Question: Does the National Electrical Code permit in an ordinary joisted brick hotel building armored cable without lead sheathing to be placed in ½-in. channel in brick wall and plastered over. The cable is installed in the interior wall only and wall is finished with plaster without lath or furring?

Finding: Yes. Armored cable not lead sheathed may be installed directly on the surface of interior brick walls and may be plastered over if the authority enforcing the Code for the territory in question is satisfied that the wall is a dry one.

Question: In general are interior brick walls considered as dry, provided the occupancy of the building is favorable?

Finding: Local authorities enforcing the regulations of the National Electrical Code are best equipped to determine whether interior walls of brick are dry. Climatic and other conditions prevent a general ruling on this point.

Regarding plaster extensions, as provided for in paragraph (b), Section 505, etc., the 1925 Edition of the National Electrical Code does not recognize extensions buried in plaster in buildings not of fire-resistive construction.

# The Electragist

*Official Journal of the*
*Association of Electragists—International*
S. B. WILLIAMS
Editor


## Persistent Effort

The electrical industry has so accustomed itself to spasmodic attempts to cultivate business that every time business development is spoken of it means "campaign." That is unfortunate because it never gets us anywhere.

A permanent, or as one member of the Industry Sales Conference put it, "persistent", sales development effort is necessary if the electrical industry is to do anything like the job it wants to do. The conference is set up for the purpose of finding ways and means to conduct such a "persistent" effort by a united industry.

The sales conference was not set up for the purpose of initiating a rewiring campaign—that is only a part of the picture. The idea of carrying through on a sales program is a new one to the electrical industry. It must learn that the fruits of its efforts will come only after consistent, persistent effort.

Not one year, two years or any definite period, but continuously hammering away at public resistance in every direction that offers a reasonable opportunity to build business.

And that means building a sales force. Advertising can't do everything. The sales conference appreciates this and is considering means for bolstering up the retail sales force of the industry—the 30,000 contractor-dealers. When the conference and the industry wholeheartedly endorse that idea, the barrier of trade indifference will fall away and the industry instead of making motions in many directions will make progress in one direction—ahead.

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## Now for Rearrangement

For the past few years the National Electrical Code has been gone over with a fine tooth comb to bring it into line with advanced thinking.

These revisions, all will admit, were necessary but now that they have been secured we hope that the industry may have a rest period of a few years in which to digest these changes. The various article committees have worked hard in recent years. They have given of their time in greater measure than the industry has any right to expect or accept.

For the next few years the revision may very properly be largely editorial with the one exception, namely, new arrangement. It would have been unwise to consider a new arrangement while all of this advanced thinking was going on. Now, however, that the bulk of the acceptable new ideas have found expression in the Code and the content may be considered stable, we can rearrange the Code to improve its usability.

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## Plain Talk

Every industry that amounts to anything has its national association. Furthermore, the economic position of any industry can be seen by looking at its association—strong association, strong industry and vice versa.

The electrical contracting industry has its national body, the Association of Electragists. It has nothing to sell, it is working for the contractors.

Membership in that body represents a willingness on the part of the individual to pay his share of the work that is being done to advance his industry.

The benefits of association work are seldom apparent directly in the individual's business. Nevertheless, the benefits are there. In a way they are intangible, but it takes men of character, capacity and ability to appreciate intangible values.

The Association of Electragists is constantly at work to protect the interest of the contractors and further the progress of the electrical industry, and all it receives each year from the membership is a paltry forty or fifty thousand dollars.

Is there any reason that the contractors are the worst off economically of the four major branches of the industry? The utilities were not strong until the N. E. L. A. was strong. Will the contractors be less strong than the power companies?

Labor never got anywhere until it organized. Are the contractors less intelligent than their men?

The contractors will get the dirty end of the stick every time, until they have organized and their collective strength is loud enough to be heard and powerful enough to command respect.

It can't be money that is holding back applications for membership because the dues to the Association of Electragists are but a fraction of what the union exacts from its members.

If it is indifference, snap out of it. If you are satisfied to be kicked about by everybody else, then stop whining and at least bear your self-imposed misery in silence.

But if you want to make a living without having it assailed on every side by more powerfully organized people,

then get together and become a part of the only national organization that can do something for you.

Send your application direct to the Association or to this magazine.

Let's go.

## An Attack on the Electrical Business

The light and power companies, and more especially the holding companies, are being made the subject of attack by Senator Walsh in the present Congress. Whenever any attack is launched upon the light and power business by any political body, the whole electrical industry has an interest at stake.

We have had many differences of opinion with central stations as to practices and apparent lack of appreciation of better trade relations, but, if you please, that was a family quarrel.

The whole growth of the electrical industry is bound up with the growth of the power industry. If political investigation, attended with unfavorable publicity, hampers and restricts the normal flow of capital into power enterprises everybody connected with the electrical industry is equally hampered and restricted in his market.

The electrical industry is a family which when attacked from without must stand together. It would be disloyal to our industry for any of us to give encouragement to any politically inspired investigation, the aim of which was to discredit the light and power business.

When Senator Walsh or any other political representative attacks the power industry he must find the electrical contractors of the country solidly lined up back of the utilities.

## Mavericks

Quantities of electrical wiring material and appliances are being sold by five and ten cent stores, drug stores, specialty shops, hardware stores and others which do not carry the approval of Underwriters' Laboratories. All of this material is lumped under the head of "substandard material." But is it?

It now appears that much of the schedule material is produced by well known manufacturing companies in exactly the same way as the approved items which are marketed by these same companies. The only difference is that one is a maverick—unbranded.

The maverick material is sold at a fraction of the recognized proper price of the approved material. Why?

The bulk of the manufacturers' production is sold to and through electrical channels. Why should they pay more than the non-electrical people for the same thing?

It is another one of the elements of internal competition in the industry. The manufacturer having captured the business of the electrical trade quite naturally looks further afield to provide for expansion or for excess capacity, as the case may be. Why doesn't he sell his standard trademarked lines to these other fields? If he did, there would not be the discrepancy in price.

But the non-electrical industry is not interested in the standards of the electrical industry or of safety measures. That field wants to sell on the basis of price and, unfortunately has found the electrical manufacturer willing to sell at a price more attractive than he gives to his regular trade of years standing. But why sell a maverick? Is it shame or is it that the manufacturer doesn't dare to brand his product that is handled by these outlets?

This business is, of course, tempting to a manufacturer. It provides production, it helps keep the wheels a-turning. But is that a sufficient excuse?

Furthermore, such policies on the part of reputable electrical manufacturers lead one to wonder sometimes whether or not approval on material is not something of a farce. It certainly encourages less reputable manufacturers to produce sub-standard material.

It becomes more and more evident that if the production of maverick and substandard brands of material is to be discouraged it must come by local dealer license laws confining the sale of electrical materials and devices to approved items.

It will be necessary, of course, to define what approved means and it may be that there will be some legal difficulties in the way of making "approved" mean "approved by Underwriters' Laboratories" or some other body, but if that be the case, let us find through the American Engineering Standards Committee or elsewhere some way of securing legal recognition.

We do not want to see local laboratories set up because of the multiplicity of tests and the unreasonableness of the demands upon the manufacturers that would result. Nor are we altogether sold on the idea of a governmental testing agency, because of the political uncertainty. Something, however, must be done, and without delay, to dam this flood of maverick and substandard material.

## Minorities

The United States government is based upon the rule of a majority tempered by a strong minority. That is a good principle because while the majority should rule they should not be allowed to run riot.

Something of that same principle seemed to guide the Electrical Committee when it sanctioned the presentation by article committee members of views dissenting from the committee report. In principle this is good, for it may prevent a majority in an article committee from attempting to go too far.

On the other hand, this procedure has opened the gates to the irreconcilables—men who refuse to listen to others or to accept any viewpoint but their own. Not being able to swing the remainder of the article committee over to their point of view they insist on taking up the time of the entire Electrical Committee.

There are times when a minority report is not only justified but is in the long run constructive. On the other hand, there is no justification for frequency of lone dissenting views.

# Association of Electragists INTERNATIONAL

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**Western Canadian Division**
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187 Portage Avenue,
Winnipeg, Man.

**Open Shop Section**
S. J. Stewart
527 St. Joseph St.,
New Orleans, La.

**Union Shop Section**
W. Creighton Peet,
70 East 45th St.,
New York City

**At Large**
G. E. Shepherd,
11 West Market Street,
Wilkes-Barre, Pa.

## COMMITTEE CHAIRMEN

**Architects and Engineers**
L. E. Mayer,
14 No. Franklin St., Chicago, Ill.

**Code**
A. Penn Denton,
512 So. W. Blvd., Kansas City, Mo.

**Conventions and Meetings**
C. L. Chamblin,
687 Mission St., San Francisco, Calif.

**Cost Data**
J. H. Schumacher,
187 Portage Ave., Winnipeg, Man.

**Credit and Accounting**
J. F. Buchanan,
1904 Sansom St., Philadelphia, Pa.

**Electragists' Data Book**
J. H. Schumacher,
187 Portage Ave., Winnipeg, Man.

**Legislation**
G. E. Shepherd
11 W. Market St., Wilkes-Barre, Pa.

**International Relations**
R. A. L. Gray,
85 York St., Toronto, Canada

**Liability Insurance**
Joseph A. Fowler,
118 Monroe Ave., Memphis, Tenn.

**Membership**
A. C. Brueckman,
314 Keyser Bldg., Baltimore, Md.

**Publication**
L. K. Comstock,
21 East 40th St., New York City

**Radio**
E. C. Headrick,
87 Broadway, Denver, Colo.

**Red Seal**
C. L. Chamblin
687 Mission St., San Francisco, Cal.

**Standardization**
L. E. Mayer,
14 No. Franklin St., Chicago, Ill.

**Trade Policy**
W. Creighton Peet,
70 E. 45th St., New York City

**Wiring Methods**
G. E. Shepherd,
11 W. Market St., Wilkes-Barre, Pa.

**Past Presidents of the National Electrical Contractors' Association**

Charles L. Eidlitz.....1901-1903
E. McCleary.....1903-1905
James R. Strong.....1905-1908
Gerry M. Sanborn.....1908-1910
*Marshall L. Barnes.....1910-1912
Ernest Freeman.....1912-1914
John R. Galloway.....1914-1916
*Deceased
Robley S. Stearnes.....1916-1918
W. Creighton Peet.....1918-1920
James R. Strong.....1920-1925
Joseph A. Fowler.....1925-1927

## PRESIDENTS AND SECRETARIES OF STATE ORGANIZATIONS

| State | President | Secretary |
|---|---|---|
| British Columbia: | C. H. E. Williams, 509 Richards St., Vancouver | J. C. Reston, 579 Howe St. Vancouver |
| Alabama: | J. R. Wilcox, 2017 First Ave., Birmingham | D. B. Clayton, Am. Trust Bldg., Birmingham |
| Arkansas: | Ed. Appler, 901 Central Ave., Hot Springs | Clem. Dresse, 316 Louisiana St., Little Rock |
| California: | H. H. Walker, 1323 Venice Blvd., Los Angeles | C. J. Geisbush, 610 Cotton Exchange Bldg., Los Angeles |
| Colorado-Wyoming: | Matt Whitney, Colorado Springs | P. Harry Byrne 965 Madison St., Denver |
| Florida: | W. S. Monroe, 308 Cass St., Tampa | Charles E. James, Fort Pierce, Fla. |
| Illinois: | Edgar Rice, 207 East Broadway, Alton | John Kuhlemeyer 1317 S. Sixth Ave., Maywood |
| Indiana: | | Frank Argast, Hatfield Elec. Co. Indianapolis |
| Iowa: | Earl N. Peak, 1603 W. Main St., Marshalltown | J. R. Payton, 13th & Walnut Sts. Des Moines |
| Kansas: | L. M. Atkinson, 116 E. First St., Pittsburgh | Harry Hagler Salina |
| Louisiana: | Robley S. Stearnes, 628 Carondelet St., New Orleans | I. G. Marks, 323 Chartres Street, New Orleans |
| Maryland: | A. C. Brueckmann, Keyser Bldg., Baltimore | W. D. Young, Calvert and Franklin Sts., Baltimore |
| Michigan: | W. F. Fowler, c-o Barker-Fowler Electric Co., Lansing | E. P. Blackman, c-o Motor Shop, Battle Creek |
| Missouri: | Charles J. Sutter, 1303 Pine St., St. Louis | W. F. Gerstner, 120 North Second St., St. Louis |
| New York: | A. Lincoln Bush, 906 6th Ave., New York City | H. F. Janick, 235 Berlin St., Rochester |
| North Carolina: | H. R. Bouligny, P. O. Box 534, Charlotte | W. P. Christian, Greensboro |
| Pennsylvania: | W. V. Pangborne, 1927 W. Montgomery Ave., Philadelphia | M. G. Sellers, 1202 Locust St., Philadelphia |
| South Dakota: | Mark J. Hurlbut, Chamberlain | Frank Shuff, Yankton |
| Tennessee: | R. L. Clift, Memphis | J. A. Fowler, 118 Monroe Ave., Memphis |
| Texas: | T. L. Farmer, 1809 Main St., Dallas | J. W. Read, 715 Capitol Ave., Houston |
| Wisconsin: | L. W. Burch, 202 E. Wash'n Ave., Madison | |

# List of Local Associations

| STATE AND CITY | LOCAL SECRETARY | STREET ADDRESS |
|---|---|---|
| **ALABAMA** | | |
| Birmingham (C) | J. R. Wilcox | 2017 First Avenue |
| **ARKANSAS** | | |
| Fort Smith (C) | Edward Ryan | Ft. Smith Lt. & Trac. Co. |
| **CALIFORNIA** | | |
| Fresno (C) | Clyde L. Smith | 1162 Broadway |
| Glendale (C) | W. L. Hyde, | 154 S. Brand Blvd. |
| Long Beach (L) | V. Ringle | So. Cal. Edison Co. |
| Los Angeles (C) | Helen I. Mikesell | 1009½ S. Hill St. |
| Oakland (C) | Laurence R. Chilcote | Hobart & Webster Sts. |
| Pasadena (C) | H. W. Barnes | 1331 N. Lake Ave. |
| Sacramento | L. W. Sherman | 910 Ninth St. |
| San Francisco (C) | E. E. Browne | 522 Call Building |
| Santa Ana (C) | O. N. Robertson | 303 N. Main St. |
| Eureka (C) | J. H. Hilfiker | 1717 H Street |
| **COLORADO** | | |
| Colorado Springs (C) | Matt Whitney | 208 N. Tejon St. |
| Denver (C) | E. C. Headrick | 89 Broadway |
| Pueblo (C) | E. F. Stone | So. Colorado Power Co. |
| **CONNECTICUT** | | |
| Hartford (C) | A. A. Angello | 473 Park St. |
| Waterbury (C) | D. B. Neth | 107 West Main St. |
| Bridgeport (C) | L. E. Finch | 529 Newfield Bldg. |
| **DIST. OF COLUMBIA** | | |
| Washington (L) | P. A. Davis | 1328 Eye St., N. W. |
| **FLORIDA** | | |
| Bradentown (C) | W. S. Stewart | W. & S. Elec. Co. |
| Daytona Beach (C) | C. Leotah Benson | 324½ S. Beach St. |
| Deland (C) | C. W. Allcorn | 132 No. Florida St. |
| Fort Myers (C) | P. K. Weatherly | Thompson-Weatherly Co. |
| Indian Riv. Dist. (C) | I. A. Paige | Vero Beach |
| Jacksonville (C) | W. A. Harper | 108 W. Bay St. |
| Miami (C) | E. A. Robinson | 118 N. W. First Ave. |
| Orlando (C) | Solon M. Lantz | 833 E. Concord |
| St. Petersburg (C) | Gardiner Blackman | ..... |
| Tampa (C) | P. F. Lyons | P. O. Box 992 |
| **GEORGIA** | | |
| Atlanta (C) | B. K. Laney | 73 Walton St. |
| Savannah (L) | Sylvan M. Byck | Byck Electric Co. |
| **ILLINOIS** | | |
| Chicago Electrical Contractors' Association | J. W. Collins | 230 No. LaSalle St. |
| Master Elec. Contractors' Association | F. J. Boyle | 304 S. Halsted St. |
| Decatur (C) | Earl Weatherford | 114 East William St. |
| Granite City (C) | Paul S. Pender | 1916 Edison Ave. |
| Peoria (C) | L. B. Van Nuys | 238 So. Jefferson Ave. |
| Rockford (C) | Donald Johnson | 106 North Second St. |
| Springfield (C) | A. D. Birnbaum | 916 West Cook St. |
| Wheaton (C) | E. C. Krage | 133 West Front St. |
| **INDIANA** | | |
| Lake County (C) | A. R. Irwin | 3461 Mich'n Av., Ind. Har. |
| Indianapolis (L) | A. W. Kruge | 2405 E. Tenth St. |
| Michigan City (C) | Walter A. Sassodeck | 913 Franklin St. |
| Muncie (C) | Harry McCullough | 113 W. Howard St. |
| South Bend (C) | R. A. Frink | 1338 Howard St. |
| Terre Haute (C) | C. N. Chess | 523 Ohio St. |
| **IOWA** | | |
| Cedar Rapids (C) | H. E. Neff | 94 First Ave., West |
| Davenport (C) | Louis F. Cory | 510 Brady St. |
| Des Moines (C) | Floyd J. Moeckly | 521 Hubbell Bldg. |
| Fort Dodge (C) | J. A. Paul | 16 So. Twelfth St. |
| Sioux City (C) | E. A. Arzt | 211 Fifth St. |
| Waterloo (C) | R. A. Cole | Cole Bros. Elec. Co. |
| **KANSAS** | | |
| Salina (C) | C. G. Loomis | 814 Cedar St. |
| Wichita (C) | P. W. Agrelius | Wichita |
| **KENTUCKY** | | |
| Lexington (C) | J. H. Brock | 235 East Main St. |
| Louisville (C) | C. L. W. Daubert | 921 South Third St. |
| Paducah (L) | K. H. Knapp | c\|o Paducah Electric Co. |
| **LOUISIANA** | | |
| New Orleans (C) | I. G. Marks | 406 Mar. Bk. Bldg. |
| Shreveport (C) | R. L. Norton | 620 Marshall St. |
| **MARYLAND** | | |
| Baltimore (C) | A. P. Peterson | 515 Cathedral St. |
| **MASSACHUSETTS** | | |
| Lowell (C) | George A. Ryan | 79 Middle St. |
| Haverhill (C) | H. W. Porter | 14 West St. |
| Malden (Medford, Everett and Melrose) (C) | H. J. Walton | c\|o Malden Electric Co. |
| Springfield (C) | C. S. Foster | 220 Dwight St. |
| Worcester (L) | John W. Coghlin | 259 Main St. |
| **MICHIGAN** | | |
| Detroit (C) | N. J. Biddle | 112 Madison Ave. |
| Grand Rapids (C) | T. J. Haven | 1118 Wealthy St., S. E. |
| Kalamazoo | E. R. Hummel | 1121 Seminary St. |
| Saginaw (C) | E. T. Eastman | 209 Brewers Arcade |
| **MINNESOTA** | | |
| Duluth (L) | Morris Braden | c-o Minn. Pow'r & Lt. Co. |
| Minneapolis (C) | W. I. Gray | 209 Globe Building |
| **MISSOURI** | | |
| Kansas City (C) | Walter C. DeBold | City Bank Bldg. |
| St. Louis Electragists' Ass'n (C) | W. F. Gerstner | 120 No. Second St. |
| Electric Employers' Association (C) | G. L. Gamp | Wainwright Bldg. |

| STATE AND CITY | LOCAL SECRETARY | STREET ADDRESS |
|---|---|---|
| **NEBRASKA** | | |
| Lincoln (L) | George Ludden | 1329 N Street |
| Omaha (C) | E. H. Brown | 1818½ Harney Street |
| **NEW JERSEY** | | |
| Elizabeth (L) | A. G. Otis | Broad Street |
| Jersey City (C) | John Nairn | 38 Oakland Ave. |
| Long Branch (C (Asbury Park and Red Bank) | Austin Hurley | Campbell Ave., Long Branch |
| Newark (C) | Paul H. Jaehnig | 435 Orange Street |
| Paterson (L) | George Pape | 43 Fair St. |
| Philipsburg (See Lehigh Valley, Pa.) | | |
| Union City (C) | Frank Zeller | 328 48th Street |
| **NEW YORK** | | |
| Buffalo (L) | Samuel S. Vineberg | 307 Electric Bldg. |
| Brooklyn (C) | H. F. Walcott | 60 Third Avenue |
| Jamestown (C) | Henry M. Lund | 309 Main Street |
| Nassau-Suffolk (C) | Henry T. Hobby | 55 Front Street, Rockville Centre, L. I. |
| New York City Section No. 1 (C) | Walter Knapp | 207 East 43rd Street |
| Independent (C) | Albert A. A. Tuna | 127 East 34th Street |
| Metropolitan (C) | George W. Neil | 96 Beekman St. |
| Niagara Falls (C) | E. M. King | 515 Niagara Street |
| Rochester (C) | Theo. T. Benz | 278 State Street |
| Schenectady (C) | Richard Spengler | 421 McClellan Street |
| Syracuse (C) | Fred P. Edinger | 802 East Water St. |
| Utica (C) | W. C. Ballda | 228 Genesee Street |
| Westchester Co. (C) | Jack Lalley | 14 Mnr. Hse. Sq., Yonkers |
| Yonkers (C) | Louis Mayer | 485 South Broadway |
| **OHIO** | | |
| Akron (C) | E. C. Rishel | 540 East Avenue |
| Canton (C) | H. S. Hastings | 301 New Vickery Bldg. |
| Cincinnati (C) | J. F. Riehle | 1642 Cedar Ave. |
| Cleveland (C) | F. T. Manahan | Chester Twelfth Bldg. |
| Columbus (L) | O. A. Robins | 1242 Oak Street |
| Lorain (C) | A. B. Walton | 3150 E. Erie Ave. |
| Toledo (C) | Fred C. Dunn | Builders' Exchange |
| Dayton (C) | Clarence Carey | 1107 South Brown St. |
| Massilon (C) | F. D. Mossop | c-o Mesco Electric Co. |
| Northern Ohio (C) | R. A. Wentz | Elyria |
| **OKLAHOMA** | | |
| Pawhuska | C. G. Sego | Pawhuska |
| **OREGON** | | |
| Portland (C) | J. R. Tomlinson | 51 Union Ave. N. |
| **PENNSYLVANIA** | | |
| Altoona (C) | Walter Bracken | Leechburg |
| Allegheny Valley | E. G. Jackson | 12 West Third Street |
| Du Bois (C) | C. E. Blakeslee | 12 E. Long Av. |
| Erie (C) | R. D. Goff | 11th and French Sts. |
| Lehigh Valley (C) | A. W. Hill | Bethlehem |
| Philadelphia (C) | M. G. Sellers | 1202 Locust Street |
| Pittsburgh (C) | D. A. Fleming | 518 Empire Bldg. |
| Wilkes-Barre (L) | Leon N. Sell | Town Hall |
| **RHODE ISLAND** | | |
| Providence (C) | H. E. Batman | 36 Exchange Place |
| **SOUTH CAROLINA** | | |
| Charleston (L) | J. P. Connolly | 141 Meeting Street |
| **SOUTH DAKOTA** | | |
| Sioux Falls | H. W. Claus | 326 S. Phillips Ave. |
| **TENNESSEE** | | |
| Chattanooga (L) | P. W. Curtis | 725 Walnut Street |
| Knoxville (L) | Jerry G. Cason | 303 West Church St. |
| Memphis (L) | J. J. Brennan | 12-16 So. Second St. |
| Nashville (C) | J. T. Shannon | c-o Electric Equip. Co. |
| **TEXAS** | | |
| Beaumont (C) | J. A. Solleder | Houston & Bolivar Sts. |
| Dallas (C) | P. B. Seastrunk | 2032 Commerce St. |
| Houston (C) | J. W. Read | 715 Capitol Avenue |
| **UTAH** | | |
| Ogden | B. Kristofferson | 2249 Washington Ave. |
| Salt Lake City (C) | C. Louis Collins | 215 Kearns Bldg. |
| **VIRGINIA** | | |
| Lynchburg (C) | J. L. Fennell | c-o Fennell & App |
| Norfolk (L) | A. W. Cornick | 200 Plum St. |
| Richmond (C) | E. M. Andrews | 15 N. Twelfth Street |
| **WASHINGTON** | | |
| Seattle (L) | P. L. Hoadley | Seaboard Building |
| Spokane (C) | William Stack | W. 1121 Cleveland St. |
| **WEST VIRGINIA** | | |
| Wheeling | Peter J. Erb | 1414 Eoff St. |
| **WISCONSIN** | | |
| Green Bay (C) | V. E. Grebel | 531 S. Broadway |
| Madison (C) | Carl J. Marsh | 710 Beaver Bldg. |
| Milwaukee (C) | E. H. Herzberg | 1604 Wells Street |
| Racine (C) | Joseph J. Small | 1910 Linden Ave. |
| **CANADA** | | |
| Montreal (C) | George C. L. Brassart | 674 Girouard Ave. |
| Toronto (C) | J. A. McKay | 302 Excelsior Life Bldg. |
| Vancouver (C) | J. C. Reston | 579 Howe St. |
| Winnipeg (C) | Fred Ball | 300 Princess St. |

(C) designates exclusively Contractor-Dealer organization.
(L) designates an Electrical League.

# JANUARY ACTIVITIES

# Electrical Industry Unites for Electragist Convention

### Leaders of All Branches Form Committees

ACCEPTANCE by the leaders of the electrical industry in and about Chicago of places on the committees arranging for the 1928 Electragist Convention, which is to be held at the Stevens Hotel August 6-10, 1928, assures a convention surpassing any previously held in interest and attendance.

Executives of contracting firms, public utilities, electrical supply jobbers, and manufacturers are already beginning preparations for the twenty-eighth annual convention.

Lake County, Indiana, electragists are uniting with those in Chicago in plans for the convention and they have promised to be present in full force.

Leo E. Mayer, President, White City Electric Company, and Executive Committeeman, Great Lakes Division, A. E. I., has been appointed chairman of the general committtee and head of the executive committee. The following have also accepted appointments to committees:

*Executive Committee:*

R. Bourke Corcoran, Manager, Electric Association, Chicago. (Chairman of Finance Committee)

John A. Duncan, Sales Manager, Illinois Electric Company, Chicago. (Chairman of Hotel Committee)

Fred F. Skeel, Western Sales Manager, Crouse-Hinds Company, Chicago. (Chairman of Entertainment Committee)

J. Walter Collins, Secretary, Electrical Contractors' Association, Chicago. (Chairman of Arrangements Committee)

Samuel A. Chase, Special Representative, Westinghouse Electric and Manufacturing Company. (Chairman of Welcome Committee)

A. H. Kirkland, Illinois Committee Public Utility Information. (Chairman of Publicity Committee)

L. E. Mayer

Miss Alva Larson, Electric Association, Chicago. (Chairman, Ladies' Committee)

John F. Gilchrist, Vice President, Commonwealth Edison Company, Chicago.

William Coleman, Manager Merchandise, General Electric Company, Chicago.

Fred R. Eiseman, Secretary-Treasurer, Revere Electric Company, Chicago.

James O. Kelso, President, Kelso-Burnett Electric Company, Chicago.

John Kuhlemeyer, Secretary, Illinois Chapter, Association of Electragists, Maywood, Ill.

William McGuineas, President, United Electrical Construction Company, Chicago.

*General Committee:*

A. I. Appleton, President, Appleton Electric Company, Chicago.

R. C. Bennett, Vice President, I. A. Bennett & Co., Chicago.

T. H. Bibber, Western Sales Manager Triangle Conduit Company, Inc., Chicago.

Charles E. Brown, Vice President, The Okonite Company, Chicago.

William S. Boyd, Secretary, Western Association of Electrical Inspectors, Chicago.

B. R. Cooper, Commercial Manager, Illinois Bell Telephone Company, Chicago.

E. M. Craig, General Manager, Building Construction Employers' Association, Chicago.

B. J. Denman, General Manager, United Light and Power Company, Chicago.

Charles A. Dostal, District Manager, Westinghouse Lamp Company, Chicago.

E. A. Edkins, Chairman, Electrical Division, Chicago Association of Commerce, General Merchandise Manager, Commonwealth Edison Company.

Arthur L. Evans, President, Standard Electric Company, Hammond, Ind.

A. M. Ferry, Secretary-Treasurer, Electrical Porcelain Manufacturers' Association, Chicago.

Ernest Freeman, President, Freeman-Sweet Company, Chicago.

H. L. Hanley, Vice President, Illinois Power and Light Company, Chicago.

A. B. Harris, President, Lighthouse Electric Company, Gary, Ind.

Walter Hoagland, District Manager, Graybar Electric Company, Chicago.

H. D. Hawks, Sales Manager, Anaconda Copper Mining Company, Chicago.

William H. Hodge, Vice President, Byllesby Engineering and Management Corporation, Chicago.

George A. Hughes, President, Edison Electric Appliance Company, Chicago.

W. A. Jackson, President, W. A. Jackson Company, Chicago.

John G. Learned, Vice President, Public Service Company of North Illinois, Chicago.

W. E. McCullough, President, Best Electric Company, Gary, Ind.

A. J. McGivern, Manager, Metropolitan Electrical Supply Co., Chicago.

T. O. Meade, President, Meade Electric Company, Chicago.

A. H. Meyer, General Manager, Midland Lamp Division, National Lamp Works of General Electric Company, Chicago.

Edward Morley, L. K. Comstock Company. (Chicago Estimators' Association)

J. Norman Pierce, President, Pierce Electric Company, Chicago.

Marshall E. Sampsell, Jr., Secretary, Central Illinois Public Service Company.

L. Sisskind, President, Central States General Electric Supply Company, Chicago.

W. C. Sharp, Vice President, Middle West Utilities Company, Chicago.

W. A. Stacey, Western Manager, Bryant Electric Company, Chicago.

William States, District Sales Manager, Edison Lamp Works of General Electric Company, Chicago.

Neal Thomson, President, Industrial Electric Company, Chicago.

Victor Tousley, Chief Electrical Inspector, City of Chicago.

A. E. Tregenza, Vice President, Chicago Fuse Manufacturing Company, Chicago.

Richard Weber, President, Weber Electric Company, Chicago.

Martin J. Wolf, Vice President, Electric Appliance Company, Chicago.

## L. W. Davis Addresses Milwaukee Contractors

"The Contractors' National Problems and the Work of the Association of Electragists" was the subject discussed by Laurence W. Davis, general manager of the A. E. I., at a well attended monthly meeting of the Milwaukee Electrical Contractors' Association at the Maryland Hotel, Milwaukee, on January 17. The meeting was presided over by F. H. Oppitz, newly elected president of the group. Reports from officers and committees showed the results of a successful year and the strong growth of the association under the direction of Edwin Herzberg, secretary-manager.

## New York Officers Installed

Installation of the newly elected officers of the Independent Associated Contractor-Dealers, New York City, was held in the main ballroom of the Hotel Astor on the evening of January 11. The ceremony, which has become an annual

# League Secretaries Exchange Ideas

**Secretary-Managers at Mid-Winter Conference in Chicago Hold Round Table Discussion on Problems**

ROUND table discussions of the problems of local electrical leagues, and addresses on live industry subjects occupied the time of delegates to the Mid-Winter Conference of electrical league secretary-managers, held at the Electric Association in Chicago, January 16 and 17. Thirty-three leagues were represented with seventy delegates.

The sessions were under the direction of J. E. North, chairman of the league council; R. Bourke Corcoran and staff members of the Society for Electrical Development presided over special sessions.

The following made addresses: W. E. Sprackling on the "Electrical Industry Sales Conference," S. L. Nicholson on "Development of Proper Ordinances," Earl Whitehorne on "Market Development." The program included round table discussions on league operations, Red Seal, the new National Red Seal specifications, wiring and rewiring activities and appliance sales. The purpose was to make each session idea producing so that each manager could have his problems analyzed and solved by other managers who had previously met the same difficulties.

Entertainment features included two luncheons at the Electric Association, a banquet at the Union League Club and a theater party.

rite in New York, was presided over by A. Lincoln Bush. The new officers for 1928 are: President, Albert A. A. Tuna; first vice president, H. M. Walter; second vice president, Irving Gaynor; treasurer, A. Lincoln Bush; financial secretary, Nathan Zolinsky; recording secretary, John J. Bauer; sergeant-at-arms, Edwin A. Hasselmeyer; directors, L. C. MacNutt, Louis Freund, Alfred Whiteley, S. J. O'Brien, Harry A. Hauft, Henry Fischbach and Fred Zenker.

## W. J. Canada Joins N.E.M.A.

W. J. Canada, for the past two and one-half years electrical field secretary of the National Fire Protection Association, has joined the staff of the National Electrical Manufacturers' Association, effective January 1. His new work will include association business with such organizations as the American Engineering Standards Committee, the Institute of Electrical Engineers, the National Fire Protection Association and the Inspector Associations.

## License Amendment

Contractors and inspectors of Indiana are discussing the possibility of an amendment to the new State Code requiring an applicant for an electrical contractor's license to pass an examination. Paul Thiele, electrical inspector in Fort Wayne, one of the leaders of the movement, states that it is hoped the amendment will go through, "thereby correcting a most deplorable condition."

## H. B. Kirkland on Speaking Tour

H. B. Kirkland of the S. E. D. is covering most of the United States on a speaking tour in which he is discussing the uniform electrical ordinance. The route includes cities in the south and far west, and the meetings at which he is scheduled to make addresses are: Northwest Inspectors' Association Convention, Seattle, Wash.; the International Association of Municipal Inspectors' Convention, New Orleans, La., and the joint convention of the Florida Association of Electragists and the Municipal Inspectors of Florida meeting at Orlando.

## North Carolina Contractors Meet

Seventy-five contractors, jobbers and public utilities representatives met in Charlotte, N. C., December 6 to hear talks by H. B. Kirkland of the Society for Electrical Development on "Wiring Conditions and the Uniform Ordinance," and N. E. Cannady, North Carolina State Electrical Inspector, on "How the Code is Made."

Among those present were R. H. Bouligny, G. W. Hunter, Eugene Hayes, W. D. Roddy, William T. Anderson, W. W. Hanks, G. W. Todd, William F. Wright, T. E. Austin, M. W. Woodside, S. B. McGinn, J. F. Gilreath, R. W. Robinson, who were representing the contractor-dealers, and W. M. Sullivan, who represented the inspection element.

# Industry Sales Conference Studies the Small Contractor

**Members of Conference Consider Ways of Promoting Better Business Methods Among All Contractors**

IN the interest of creating an all-industry sales plan for the development of the residence market for electric service and equipment, the second meeting of the Industry Sales Conference was held in New York on January 11 at N. E. M. A. headquarters. Established last fall, this Conference is composed of delegations representing the four major national associations and the league council. W. E. Sprackling, president of the Tubular Woven Fabric Company is its chairman.

Reports of functional committees, appointed at the first conference on November 21st, were analyzed and referred to the executive committee of the conference as the basis for final recommendations to be submitted next spring to the four national associations, now acting as council of the industry, in the directorate of The Society for Electrical Development.

In reviewing committee reports there was a consensus that to carry forward the contemplated broad program for intense local, regional and national sales effort there must be the highest measure of co-operation and support from all branches of the industry. In this connection attention was directed to the need for bringing into the co-operative fold that large body of small contractors who do the major part of residential wiring installation but who have no particular "industry consciousness."

With a view, therefore, to carrying on a broad educational work among all contractors the conference is concerned, among other things, with the possibilities of promoting better business methods similar to work that has been done so successfully by the plumbers.

At the same time careful consideration is being given to the necessity of adapting the merchandising policies of the industry to such a movement, so that the installation of additional outlets in the home may be capitalized by the immediate sale of appliances and lighting equipment. In this as in the general effort to enlist the co-operation of all local interests on a nation-wide basis the central stations will be called upon to assume leadership, utilizing the services of the local leagues.

## Florida Electragists' Convention

A joint convention of the Florida Association of Electragists and the Florida Association of Municipal Electricians will be held February 23, 24 and 25 at Orlando, Fla. There will be business sessions each morning, with a manufacturers' exhibit, banquet, dance, golf tournament, and other entertainment features. Preston Ayres is president of the Florida Association, Charles E. James, Secretary, and T. A. Brown, T. E. Satchwell and E. A. Robinson, executive officers.

## Television for the Home

The first demonstration of television broadcasting and home reception was made January 13 in Schenectady, N. Y., by the General Electric Company and the Radio Corporation of America. The moving images and the voices of a man and a woman were transmitted by radio from the research laboratories to three different homes in the city.

The elements of the television home receiver are a light source, a scanning device and a synchronizing system. The same sound radio receiver now in use can be used with the television set, synchronized. The signal, or electro-magnetic wave from the television transmitter is received in equipment designed to receive modulations as high as 40,000 cycles. A neon gas filled lamp is substituted for the loud speaker of the radio receiver. D. McFarlan Moore, inventor of the lamp and an engineer at the Edison Lamp Works, found this gas the most efficient and sensitive.

### Notice!

J. A. Fowler of Fowler Electric Company, Memphis, Tenn., has asked THE ELECTRAGIST to publish this notice:

"On one or two occasions a fakir calling himself Robert E. Fowler, has imposed on friends of mine in Chicago, representing himself to be my brother and claiming to have had a misfortune as his excuse for soliciting a loan. I want to warn friends of mine against such an impostor."

## Contractors Study Income Tax

Contractors of Minneapolis met at the Builders' Exchange January 19 to study the principles of bookkeeping and income tax reports for the electrical contractor. J. E. Lloyd was in charge of the program. Jeremiah Tripp is chairman of the contractors.

## Fixture Groups Convene

The annual meeting and convention of the Artistic Lighting Equipment Association and the Illuminating Glassware Guild was held in Cleveland January 25 to 28. A trade promotional campaign designed to awaken in the minds of the industry and the public a greater consideration of good lighting was presented to the members in attendance.

## Boston Contractors Elect Officers

Alfred J. Hixon of the Hixon Electric Company was reelected chairman of the Greater Boston Electrical Contractors' Association at its annual session January 5. Other officers for the year are: George B. Quimby, Blake Electric Company, vice chairman; Charles A. Rounds, Rounds Electric Company, secretary-treasurer; Harry Cole, Osborn Wilkinson and James J. Smith, members executive committee; Joseph Stanton, delegate to the national convention.

## W. Winans Freeman Awarded Medal

W. Winans Freeman, president of the Society for Electrical Development, was awarded the James H. McGraw Medal for Cooperation at a testimonial dinner in his honor January 10 in New York. Mr. Freeman, who directed the reorganization of the S. E. D., found his idea of industrial cooperation endorsed by leaders in all branches of the electrical industry.

The following addressed the gathering of 300 electrical men: Joseph A. Fowler, Association of Electragists, International; Howard T. Sands, National Electric Light Association; Clarence L. Collens, National Electrical Manufac-

turers' Association; J. E. North, Electrical League Council; P. G. Gosscler and Owen D. Young. The judges who awarded the medal to Mr. Freeman were: J. E. Montague, S. L. Nicholson, G. E. Cullinan and James R. Strong. Charles L. Edgar was chairman of the dinner committee, Frank L. Smith toastmaster and Harry B. Kirkland in charge of arrangements.

## Executive Committee to Meet

The semi-annual meeting of the executive committee of the Association of Electragists, International, will be held March 19 and 20 in New York at the Builders' Exchange Club.

## Albany Elects Officers

The new members of the executive committee of the Albany Electric League include: Harry Coleman, Edward Murphy and Charles J. J. Bernhardt, representing the contractors; John Haley and Alexander Anderson, the central station, and John Portley and Gregory Henzel, the jobbers.

J. H. Van Aernum, formerly with the Electric League of Pittsburgh and now merchandise manager of the New York Power and Light Corporation, addressed the first meeting of the new executive committee on January 12.

## Course in Illumination

A course in illumination for electrical contractors of New York, under the auspices of the metropolitan section of the N. E. L. A. began January 17 in the Electric Building, Long Island City, N. Y. Similar courses will be held later in other boroughs of the city. The total enrollment was more than 75. February lectures are:

February 7. "Window Lighting," by L. H. Graves of Curtis Lighting, Inc., and "Store Lighting," by D. H. Atwater, Westinghouse Lamp Company.

February 14. "Residence Lighting," by C. Arthur Musson of the United Light and Power Company and H. V. Hartman of the New York Edison Co.

## Michigan Considers State Code

A committee has been appointed by the Electrical Extension Bureau of Detroit to consider a uniform state electrical code and license law. Representatives of the contractors, fixture dealers, central stations and city inspectors were appointed to the committee which is considering all phases of the subject. H. S. Lofquist is secretary.

## Woman Electragist Opens New Store

The only woman in Massachusetts who is a licensed master electrician, Mrs. Iola LeBaron, continuing the business started by her late husband, R. W. LeBaron, has just opened a new store in Arlington, Mass. She is an electragist. The following letter was sent out to patrons and nearby prospects upon the opening of the store:

R. W. LeBARON
Electrical Contractor
ELECTRICAL SUPPLIES

October 29, 1927.

To Residents of Arlington:

We take pleasure in announcing the opening of our New Electrical Store at 608 Massachusetts Avenue.

For thirty-three years "LeBaron" has been a familiar name in Arlington. Hundreds of owners of houses and business buildings, enjoying the advantages of electricity, can honestly say "LeBaron knows how."

At our new store we are equipped to supply your every electrical need. We have the best in Westinghouse Electrical Appliances, the latest modern lighting fixtures, and a staff of expert electricians for house wiring and repair work. Every order receives careful attention and satisfaction is assured.

You are cordially invited to call on us any time we can be of service to you. Our advice and an estimate on any electrical work you plan to have done will not obligate you in any way.

Our telephone number is Arlington 0022.

Sincerely yours,

R. W. LeBaron

P.S. We also have a complete line of "DU PONT" Paints and Varnishes.

## Group Organization in Boston

The secretary of the Boston Metropolitan Electrical League, Edward G. Jay, reports that group organization within the membership of the league is a trend noted in 1927 which he thinks will become quite widespread in 1928. The contractor group of the league is organizing and plans are under way for organization of special groups such as electric sign men, motor maintenance and repair men, radio, fixturing, refrigeration and domestic engineering.

## Illumination Courses in Cincinnati

The University of Cincinnati, cooperating with the local electric club, will hold an evening course on illumination beginning February 7.

Contractors, engineers and designers are being enrolled for the course which will be held once a week until the end of May. Among the topics to be covered are

Radiation
Light Sources—
- Distribution of radiation frequency
- Incandescence
- Arc—vapor lamps
- Fluorescence
- Luminescence
- Phosphorescence

Definitions
Physiology of the eye
Devices for measuring light and illumination
Photometry
Flicker photometer
Light—shade—color
Glare—irradiation
Natural vs. artificial light—proper use of daylight—cost of daylight
School and residence lighting
Industrial lighting—street lighting
Flood lighting—projection
Special decorative effects—theatres, etc.
Elementary principles of design of reflectors.

## New League Officers

The following officers have been elected for 1928 to fill positions on the staff of the Electric League of Washington, D. C.: President, A. F. E. Horn, General Electric Company; vice president, Joseph T. Kirchner, Biggs & Kirchner; treasurer, Frank T. Shull, Shull Manufacturing Company; secretary, Norman H. Barnes, Potomac Electric Power Company.

## New Officers in Colorado

B. J. Rowan was elected chairman of the Electrical League of Colorado and the following committees have been appointed: Finance: Mackell, chairman; Cooper, Francis and Sturgeon. Program: McCammon, chairman; Cornell, Headrick and Herzberger. Entertainment: Newell, chairman; Bird, Knapp and Vosmer. Membership: Cooper, chairman; Bacon, Clark and Guscott. Publicity: Herzberger, chairman; Buck, Guscott and Watts. Welfare: Staible, chairman; Gentry, Kaffer and Richard. Attendance: Headrick, chairman; Bird, Keeler and Watts. Red Seal: Sturgeon, chairman; Bacon, Cornell and McCammon.

A summary of the field activities during 1927 of the league's field man indicates that 4,104 extra outlets were added through his efforts.

## New Inspectors for Youngstown

The mayor of Youngstown, Ohio, has appointed P. J. Lowry chief electrical inspector for the city and F. J. Witt as assistant.

# Prestige Building

THE Santa Barbara, Cal., members of the Association of Electragists are building prestige for themselves by advertising their affiliation with the international organization in large space taken in the local papers. One of the full page advertisements which they ran is shown below.

DEVOTED TO HIGHER ELECTRICAL STANDARDS

*Safety*  *Confidence*

## "ELECTRAGIST"

¶ IF YOUR ELECTRICAL FIRM HAS THIS DISTINCTION, YOU CAN TRUST THEM

A word about the "Electragist" electrical firm. The privilege of this designation is accorded members of the Association of Electragists, International. Their purpose is to knit closer the electrical contractors of the country, to make their findings from practice a matter of common knowledge, to aid and assist each other in making their businesses profitable and therefore justifiable; to shape manufacturing trends as far as possible through their daily contacts with the consumer and to advance their own knowledge of the electrical world for the ultimate benefit of the buyer of electrical installations.

*What It Therefore Means to Specify an "Electragist" Firm*

An electragist firm is equipped to render competent counsel on matters pertaining to electrical installation and equipment—a qualification gained from their own experience plus that of the whole wide world.

A firm so designated is thus given to more forethought and less after-thinking. This means continued satisfaction to Mr. Buyer because careful planning will have eliminated errors and guess work.

Furthermore, a firm thus associated in the work of advancing their professional field to higher standards is bound to give better craftsmanship, more careful attention to details and trustworthy work.

Patronize successful firms—it is cheaper! Electragists are successful.

PATRONIZE THE MEMBERS OF THE

ASSOCIATION OF ELECTRAGISTS INTERNATIONAL

Santa Barbara Branch

| | | |
|---|---|---|
| Alamar Electric Company<br>*"ELECTRAGIST"*<br>635 E. Haley Street<br>Phone 2946 | Channel Electric Company<br>*"ELECTRAGIST"*<br>523 Anacapa Street<br>Phone 2775 | Gutierrez Electric Company<br>*"ELECTRAGIST"*<br>220 W. Carrillo Street<br>Phone 1242 |
| Heumphreus-Smith Electric Co.<br>*"ELECTRAGIST"*<br>707 State Street<br>Phone 740 | E. W. Huston, Contractor<br>*"ELECTRAGIST"*<br>214 Palo Colorado<br>Phone 2800 | Mission Electric Company<br>*"ELECTRAGIST"*<br>1020 State Street<br>Phone 295 |

## Two Compensation Decisions

The courts in two recent cases have handed down decisions on workmen's compensation of interest to electrical contractors.

An electrician, wiring a house, was thoroughly drenched by a sudden rainstorm, thereafter had to ride some miles in an open car in wet clothing which chilled him, and a few days later pneumonia resulted. Held, that the injury arose out of the employment.—Newman v. Schmits, California Industrial Accident Commission, January, 1927.

An employee of a general contractor in construction work on a building was injured through the negligence of an employee of a sub-contractor on the same building. He brought action for damages against the sub-contractor. Both contractors were insured under the workmen's compensation act. Held, citing Bindeubel v. Wilcutt, 244 Mass. 195, 138 N. E. Rep. 239, that all employees injured in the work were under the workmen's compensation law and to receive the same compensation, and that the action would not lie.—Catalano v. Watts Corp., Supreme Judicial Court of Massachusetts, 152 N. E. Rep. 46.

## OBITUARIES

### Benjamin S. Cornwell

Benjamin S. Cornwell, 46, of St. Louis, Mo., died at his home December 19 after an illness of three years. Mr. Cornwell was engaged in the electrical contracting business in St. Louis for sixteen years, being president of the Cornwell Electric Company. Prior to that time he spent four years in Porto Rico as an electrical engineer. He is survived by his widow, his mother and a brother.

### Richard J. Dibowski

Richard J. Dibowski, secretary and director of The Wadsworth Electric Manufacturing Company, Covington, Ky., died suddenly at his home of heart attack. Mr. Dibowski was one of the founders of the Wadsworth company. About him D. T. Wadsworth, vice president and chief engineer, said: "We certainly will feel his loss very deeply as an associate of this company and also our city and state will miss him. Outside of being a wonderful business executive he was a good man and highly respected by everyone who knew him."

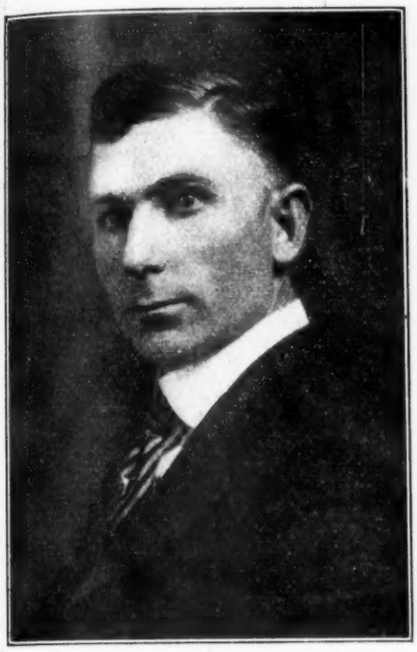
### Lewis P. Mead

Lewis P. Mead of the Mead Electric Company, Ltd., Montreal, Canada, died at his home December 28. Mr. Mead was a lecturer for some years in electrical engineering at the Montreal Technical School. He was born in Providence, R. I., and moved to Montreal in 1897 to become superintendent in the Eugene F. Phillips Electrical Works, Ltd. In 1910 he formed his own company, the Mead Electric Company.

### George T. Howard

George T. Howard, President of the Indiana Association of Electragists, and member of the Althoff Howard Electric Company of Evansville, Ind., died December 27. Mr. Howard was just elected president of the State Association in November and he was very active in Association work. He had a host of friends in the electrical field. C. W. Nunn wrote about him: "Mr. Howard was always ready to do anything constructive toward the up-building or betterment of the electrical industry. He

was one of the men who fostered the new city electrical code and his perse-



George T. Howard

verance and desire for higher standards was chiefly responsible for its adoption. The local electrical industry has suffered a great loss in the death of Mr. Howard."

## Ralph M. Obergfell

Ralph M. Obergfell, associate electrical engineer of Underwriters' Laboratories, died at his home in River Forest, Ill., on January 9. Following his completion of a course in mechanical engineering at Lewis Institute, Chicago, Mr. Obergfell was for three years connected with the operating department of the hydro-electric development of the sanitary district of Chicago. He became associated with the Chicago office of Underwriters' Laboratories as assistant electrical engineer in April, 1914, and was appointed to the position of associate electrical engineer in February, 1925. During his period of service at the Laboratories he established a wide acquaintance and made many friends among the members of the electrical industry.

## News Notes Concerning Contractor-Dealers

The Dwyer Electric Company, Inc., of Rochester, N. Y., has elected the following officers: President, P. A. Dwyer; vice president, Eugene J. Dwyer, and secretary-treasurer, M. P. Dwyer. This firm makes a specialty of installing automatic telephone exchanges. It also does power and industrial wiring and house wiring.

Harvey Dodge, Leo Zelaszny, and George Neeb, of Lackawanna, N. Y., have been appointed members of the new city electrical commission, to serve with State Fire Underwriter Benjamin Love and City Councilman John J. Griffiths.

E. R. Bateman, Washington, D. C., last year's vice president of the electrical league, has moved into his new store, designed by himself and laid out to be most convenient for the sale of appliances.

Another contractor-dealer who has just moved to a larger store is the Paso Robles Electric Shop, of Paso Robles, Calif., which is owned by Sid Bretherton, Jr.

George C. Buerkel and Philip W. Gaston, who have been conducting a contracting business in Boston under the name of the Back Bay Electric Company, have incorporated and are now doing business at the same address under the name, Buerkel-Gaston, Inc.

The McNally Company, contractors of Pasadena, Calif., has changed its name to "Rowley Electric" with the same location and ownership. C. A. Rowley is president of the firm which is contemplating moving into newer and larger quarters some time during the present year.

An electric fixture studio has been opened by the E. C. Morse Electric Company, Battle Creek, Mich., to display house lighting fixtures and electrical appliances. The residence was completely furnished by a local store, and the Morse Company fitted it with complete lighting fixtures, floor lamps, appliances, etc.

# New Electragists

The following contractor-dealers have made application and been accepted into the A. E. I. since the publication of the last list in the January issue:

**ARIZONA**

**Phoenix:**
Vinson Bros. & Carter

**CALIFORNIA**

**Oakland:**
Scott-Buttner Elec. Co.

**CONNECTICUT**

**Greenwich:**
Charles W. Emery

**New Haven:**
H. J. Birney

**DIST. OF COLUMBIA**

**Washington:**
William F. Scott

**GEORGIA**

**Atlanta:**
Woodward Elec. Co.

**Macon:**
H. E. Lowe Elec. Corp.

**IDAHO**

**Moscow:**
Adams Elec. Co.

**ILLINOIS**

**Abingdon:**
Bond Elec. Shop

**Bellwood:**
Electric Service Co.

**Chicago:**
Chas. F. Reinke & Co.
Matthew Taylor Elec. Co.

**Downers Grove:**
Main Elec. Shop

**KANSAS**

**Abilene:**
C. E. Mark Elec. Co.

**MICHIGAN**

**Manistee:**
Knudstrup Elec. Co.

**Plymouth:**
Corbett Elec. Co.

**MISSISSIPPI**

**Indianola:**
Julius Radio & Elec. Shop

**MISSOURI**

**St. Louis:**
K. R. Anderson

**NEW YORK**

**Mahopac:**
Orson H. Lyon

**Monticello:**
Henry Wagner

**Middletown:**
Middletown Elec. Co.

**Sanborn:**
Royal T. Levan & Sons

**OHIO**

**Dayton:**
J. C. Federle

**Sandusky:**
Siggengs Elecl. Service

**PENNSYLVANIA**

**Huntingdon:**
Elmer S. Free

**Philadelphia:**
Williams & Jones

**TENNESSEE**

**Clarksville:**
The Electric Shop

**VERMONT**

**Northfield:**
Royal F. Britain

# News of the Manufacturers

## Switch and Outlet

Harvey Hubbell, Inc., Bridgeport, Conn., are manufacturing a combination convenience outlet and flush wall switch. A quarter turn of the tap, which is a switch, and the lights are on; a quarter turn to the left and the

lights go off. The tap is wired independently and is alive at all times. It is small enough to fit any standard gang outlet box, and is recommended by the manufacturer for use in kitchen, bathroom, laundry, beauty parlors, dentist offices and wherever a switch control is required for a ceiling light and electric service is required from a convenience outlet.

## Extension Cord

Belden Manufacturing Company, Chicago, has developed a flat rubber insulated extension cord for running under the rug to provide convenient outlets in any part of the room. One end is fitted with a soft rubber plug which will not break and can not be crushed; the other end is fitted with receptacle for a standard plug.

## Receptacles and Caps

The Bryant Electric Company, Bridgeport, Conn., is distributing a "Ripple Cap," with a new top design. The new feature aids in gripping the cap when inserted or withdrawn from the receptacle.


A new line of "Spartan" receptacles with round metal covers for mounting directly on 3¼-in. and 4-in. outlet boxes is described by Bryant Electric Company. These are single and duplex composition receptacles, side wired, with a new positioning feature. The faces are cupped, and a raised rib of composition is mounted across the cup between the slots. These slot finders are designed to make quick connection, as the prongs of the cap can be inserted easily. The covers are of steel and can be finished either with sprayed black lacquer or Cadalyte—a cadmium plating which resembles aluminum.

## Shell Type Motor

The Lincoln Electric Company, Cleveland, has perfected a squirrel cage motor for use in woodworking and other machinery requiring high speed motors. This is a shell type motor, all-welded, of standard dimensions. It is supplied in two sizes, 3 h.p., with an external diameter of 6.5 in. and length of 4.5 in., and 5 h.p., with same diameter and 6 in. in length. Both motors are either two- or three-phase, 60 cycle, 3,600 r.p.m. The stator is composed of laminated sections, welded together; the rotor is either a straight or tapered bore.

## Panel Board

A new line of panel boards and steel cabinets for light and power has been put on the market by the Benjamin Electric Manufacturing Company, Chicago, Ill. Their construction includes such features as: 30 ampere, 250 volt heavy duty tumbler switches; individual switches, switch plates and fuse receptacles which are removable from the front without removing trim; 4-in. gutter space on all four sides of the panel; slotted fuse receptacles which permit testing of fuses without removing same; adjustable mounting studs which allow for panel adjustment both in and out and laterally; all metal parts which are rust-proofed.

## Wrench

A wrench designed for use on hard-to-get-at nuts is being manufactured by the Billings & Spencer Company, Hartford, Conn., under the trade name "Klose Kwarter Wrench." It

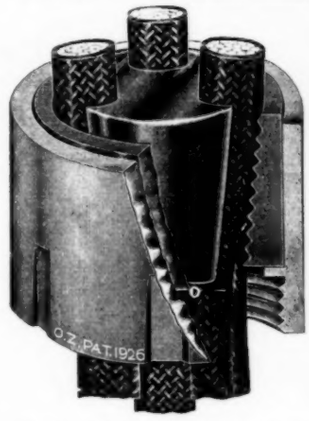

is double headed, with openings at a 75 degree angle, jaws narrow and pointed and heads very thin. It is made in several sizes to fit standard nuts from chrome molybdenum steel.

## Time Switch

The General Electric Company, Schenectady, N. Y., announces a new small motor operated automatic time switch for use in controlling A. C. circuits where the load is less than 10 amp. The new switch has a revolving dial divided into twenty-four parts, half of the dial being finished in white enamel and the other half in black, to represent day and night. Two arms, registering on the dial, can be set at half-hour intervals to control the making and breaking of the local circuit, the maximum time interval being 11½ hours. The time keeping element is a small disc-type synchronous motor, consuming three watts, operating the clock mechanism and contactors.

## Cable Support

O. Z. Cable Support Company, Brooklyn, N. Y., announces a new cable support for rubber covered, varnished cambric and lead covered cables in vertical conduits. It consists of two parts, body and plug. Body is malleable iron casting into which is pressed a molded composition bushing knurled to provide a holding surface. The body is threaded inside on the end away from the bushing for fastening conduit. To install the support the body is screwed to the conduit entering the




bottom of the cable support box in place of the regular conduit bushing. Cables are then pulled in, spread slightly, and plug driven in with a hammer. Support body and plugs are marked with size conduit and wire to be used. Supports are available for holding one wire in conduits from 1 to 2½ in. and for two or more wires in conduits from 1 to 5 in.

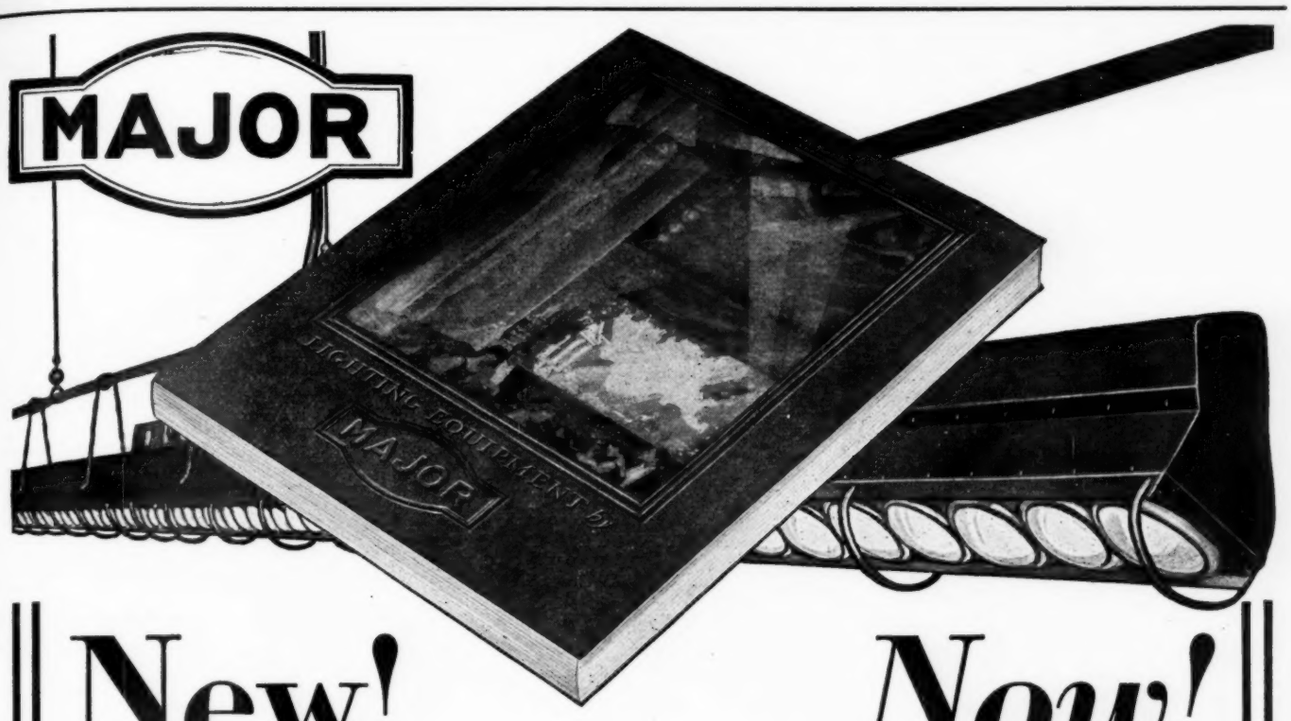
## Switch Plates

Crystal Switch Plate Corporation, New York City, has added to its line of glass switch plates two new plates which can be had in gold, silver or radium finishes. These


plates accommodate the Bryant Electric Company's Triggle switch, No. 2860 which is a 3-circuit switch, both of which are indicating. These switches may be used as a 3-circuit electrolier switch or for controlling 3 or 2 separate circuits.

## Access Fittings

A new "obround condulet" has been announced by the Crouse-Hinds Company, Syracuse, N. Y., which the manufacturers claim has the following advantages: the chamber is larger, thus making the work of splicing and taping easier, the cover on the wiring device is held to the condulet by wedge shaped nut




# New! Now!

## A Complete Data Book and Catalog *Free!*

Every page of this new Major Catalog carries information of vital importance to electrical contractors with theatre jobs on hand or in prospect. Facts, figures—the why and how of every stage and auditorium lighting unit—a complete electrical plan for the stage and details to enable you to show years of experience in figuring and installing theatre jobs.

There are many public and fraternal buildings that can use Major Products. Also Major Floodlights can be used everywhere for many uses.

The two things to do *now* is to send for the catalog and get in touch with the Major man nearest you. It means better jobs and greater profits.

MAJOR
**Major Equipment Company**
**4603-19 Fullerton Avenue, Chicago**

### DISTRICT OFFICES

*Atlanta, Ga.*
L. A. Crow
64 Cone St. N. W.

*Baltimore, Md.*
Wolfe-Mann Mfg. Co.
320 S. Hanover St.

*Boston, Mass.*
J. J. Cassidy
222 Devonshire St.

*Brooklyn, N. Y.*
Fred G. Kraut
182 N. 11th St.

*Buffalo, N. Y.*
Ralph E. Jones
184 Main St.

*Charlotte, N. C.*
H. D Quarles
6 Ashland Ave.

*Cincinnati, Ohio*
E. F. Schurig
44 E. Third St.

*Cleveland, Ohio*
D. C. Griffiths
Rockefeller Bldg.

*Dallas, Tex.*
R. S. Wakefield
2425 Commerce St.

*Denver, Colo.*
Alex Hibbard
Hibbard-Weedon Elec. Co.
1940 Balke St.

*Detroit, Mich.*
H. H. Norton
2683 Wabash Ave.

*Indianapolis, Ind.*
The Scott-Jaqua Co., Inc.
230 S. Penn St.

*Jacksonville, Fla.*
F. W. Knoeppel
2822 St. Johns Ave.

*Kansas City, Mo.*
Robert Baker
106 E. 14th St.

*Los Angeles, Calif.*
Otto Demmert
106 W. Third St.
E. Zinsmeyer
1127 S. Wall St.

*Memphis, Tenn.*
C. B. Rutledge
417 Prescott St.

*Minneapolis, Minn.*
L. H. Cooper
442 Builders Exch.

*New Orleans, La.*
W. J. Keller
509 Conti St.

*Omaha, Neb.*
B. J. Fleming
213 S. 12th St.

*Philadelphia, Pa.*
Wm. A. MacAvoy Jr.
244 N. 10th St.

*Pittsburgh, Pa.*
Coffin-Perry Co.
319 Third Ave.

*Salt Lake City, Utah*
Raymond Ackerman
318 Dooly Block

*San Francisco, Cal.*
Baker-Joslyn Co.
490 Second St.

*Seattle, Wash.*
Metropolitan Elec. Supply Co.
2914 First Ave. S.

*St. Louis, Mo.*
O. H. Rottmann
3649 Bell Ave.

*Tampa, Fla.*
F. C. Arnold
109 E. Jackson St.

*Toronto, Ont.*
Square D Company Canada, Ltd.

*Vancouver, B. C.*
Langley Electric Mfg. Co., Ltd.
Granville Island

*Walkerville, Ont.*
Square D Company Canada, Ltd.

*Winnipeg, Man.*
Langley Elec. Mfg. Co., Ltd.
677 Notre Dame Ave.

# THEATRE LIGHTING EQUIPMENT

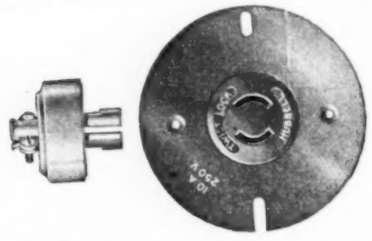
fasteners which cannot become loosened by vibration. This new feature makes it unnecessary to locate a screw hole, as the covers are placed on the condulets and screwed on either side of the condulet opening. This new form of construction, according to the manufacturers, makes it easy to pull conductors and removes the possibility of injury to the conductors during installation. All the wiring devices have clamp terminals on the back which are operated from the front.

## Pipe Hangers

"Wedgetite" pipe hangers have been put on the market by the Crouse-Hinds Company, Syracuse, N. Y. These hangers consist of two pieces: a hook and a wedge, which are provided with saw teeth to eliminate vibration. The wedge is interchangeable with all types and sizes of hooks. The hanger is made of malleable iron and the wedge is of tempered steel.

## Flush Receptacle

"Twist-Lock" is the name given by Harvey Hubbell, Inc., Bridgeport, Conn., to its new flush receptacle with a locking cap which is designed for use in industrial plants, garages and other places where the cap is continu-



ally subjected to strain, severe service or constant vibration. The receptacles are rated 10 amp., 250 volts and are made with 3¼ in. and 4 in. covers.

## Push Buttons

Reynolds Spring Company, Jackson, Mich., has put on the market a line of molded push buttons in dark brown with scarlet center button. All metal parts are insulated and the mechanism is recessed to take No. 14 wire. Four different styles are offered.

## Transformers

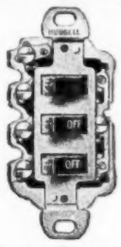
Sorgel Electric Company, Milwaukee, has placed on the market a new line of air cooled, dry type transformers, ½ to 50 kva, one, two and three phase, with conduit connections. They are totally enclosed, self-contained and arranged for wall mounting. They have silicon steel impregnated cores.

## Motors

The Lincoln Electric Company, Cleveland, Ohio, announces a new switch motor in sizes from ½ to 30 h.p., 2- or 3-phase, 60 cycles. This motor can be started across the line without the use of a starting compensator, and with low starting currents. It is made of welded steel construction.

## Toggle Switch

Duplex and triplex trigger action toggle switches, made up in gangs of two or three, mounted in a single porcelain box small enough for a standard single outlet box, are announced by Harvey Hubbell, Inc., Bridgeport, Conn. All switches in the gang have a common terminal on one side which simplifies the wiring as compared with ordinary three-gang installation. Each switch is rated at



5 amp., 125 volts to 2 amp., 250 volts. The switches may be all single pole or one in each gang may be a three-way switch.

## Circuit Breakers

Roller-Smith Company, New York, announces a new line of circuit breakers described in bulletin No. 580. A number of different models are included in the line, ranging in capacity from 5 to 800 amp., for potentials up to 600 volts, with D. C. or A. C., one, two, three and four pole; overload, undervoltage and combinations; instantaneous and time limit trip. The box layout is new. The boxes are in two pieces, with a rear section and cover; the rear section, carrying the breaker, is mounted against the wall or column or on iron framework, as may be desired, and is fastened in place with screws which are inserted from the front. Knockout holes are provided at top and bottom and conduit connections are made, the cables pulled in, connections made and cover set in place.

## Personnel Changes

The Burg Electric Sales Company, manufacturers' representatives, announce the opening of a new Philadelphia office at 906 City Centre Building, with Herman Ellen in charge.

Wallace L. Fleming has been appointed district representative for Trumbull-Vanderpoel Electric Manufacturing Company, with headquarters in Chicago.

The Trumbull Electric Manufacturing Company has appointed Frank M. Buckley sales representative in Pittsburgh as assistant to A. H. Bergendahl, and J. S. Ingebretsen in charge of the new Boston office in the Statler Building.

Curtis Lighting, Inc., announces the appointment of Otis F. Fulhage as resident engineer in Des Moines, Iowa; also the appointment of George R. Kelly to the sales force in Chicago; Irving D. Smith resident engineer for Canada with offices at Toronto.

Graybar Electric Company has made the following appointments: J. F. Davis, manager, Boston office; A. R. Loughborough, manager, Pittsburgh; H. W. Dye, service and credit manager, Denver; Louis Fiille, secretary, and Martin Wagner, assistant secretary.

R. M. Plympton, formerly of the Babson Statistical Association, is now salesman in charge of consumer motor business in Chicago for the Lincoln Electric Company, Cleveland, Ohio. R. P. Nick, formerly of the Baltimore office of this company, is now in charge of the office at Lancaster, Pa.

J. J. Miner, 141 E. Jefferson Avenue, Detroit, has been appointed sales representative for Fullman Manufacturing Company, Latrobe, Pa., for the state of Michigan.

Silvray Company, Inc., New York, announces the appointment of the following distributors: Philadelphia Daylight Company, Bourse Building, Philadelphia; Silvray Company, 211 Renshaw Building, Pittsburgh; Byck Electric Company, 137 Bull Street, Savannah, Ga.; Robert H. Gordon, 2511 First National Bank Building, Detroit, and Bell & Slimmon, 443½ E. Third Street, Los Angeles, Cal.

Taplet Manufacturing Company, Philadelphia, has appointed C. H. Van der Bloom, 3684 E. 163rd Street, Cleveland, Ohio, district representative.

## New Catalogs

Federal Steel Products Company, Newark, N. J., is distributing a new bulletin covering the entire line of panels and panelboards. The panels are fully listed and illustrated in flush and surface types with and without arrangements for toggle switches and the through feed type.

The new catalog, No. 56, of Colt's Patent Fire Arms Manufacturing Company contains pictures, descriptions, installation information and data about "Noark" service switches, fuses, fuse boxes, etc. Wiring diagrams and complete dimensions are provided for each switch in the line. A number of apartment house meter installations are illustrated. The catalog is published in two sizes, pocket size and letterhead size, loose leaf form.

## News of the Manufacturers

Hatheway & Co., New York City, national distributors for several large manufacturers of electrical supplies, has been appointed sales agent in New England, New York State and the Metropolitan District for the Wirt Company, Germantown, Philadelphia, Pa., manufacturers of the Wirt dimolite line and Wirt radio loudspeakers.

Jenkins & Gunther, Santa Fe Building, Dallas, Texas, has been appointed sales agent for the Rome Wire division of the General Cable Corporation. The territory will include the states of Texas, Arkansas, Oklahoma and Western Louisiana. They will also represent the Rome Wire division on all products of its manufacture.

The Okonite Company of Passaic, N. J., with sales offices at 501 Fifth Avenue, New York City, has purchased the insulated wire department of the Hazard Manufacturing Company, Wilkes-Barre, Pa. This will be operated as The Hazard Insulated Works, a division of the Okonite company.

John A. Bennan, who is well known in the electrical industries through his development of the Jefferson Electric Manufacturing Company, of which he is president, has been elected president and general manager of the

Chicago Fuse Manufacturing Company. Mr. Bennan succeeded W. W. Merrill, who has retired after being with the company for 30 years.